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VOL. II.—10TH YEAR. SYDNEY: SATURDAY, JULY 14, 1923. No. 2.

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Table of Contents

PAGE.

ORIGINAL ARTICLES—

"The Investigation of the Immunity Reactions in Hydatid Disease: A Preliminary Report," by K. DOUGLAS FAIRLEY, M.D. 27

REPORTS OF CASES—

"A Case of Cerebral Aneurysm Simulating Meningitis," by SINCLAIR GILLIES, M.D. 37
"Acute Appendicitis with Lobar Pneumonia," by ALAN PRYDE, M.B., B.S. 38

REVIEWS—

Some Conceptions of Public Health 39
Surgery of the Stomach and Duodenum 40
Aids to Bacteriology 40

LEADING ARTICLES—

The Pan-Pacific Science Congress 41
The Hobart Hospital Farce 42

CURRENT COMMENT—

The Permeability of the Intestinal Mucosa to Bacteria 43
The Arterial System and Diets Rich in Protein .. 44
Death by Electrocution 45

PAGE.

ABSTRACTS FROM CURRENT MEDICAL LITERATURE—

Therapeutics 46
Urology 47

BRITISH MEDICAL ASSOCIATION NEWS—

Scientific 48
Nominations and Elections 53
Notices 53

PUBLIC HEALTH—

"Insulin" 53

OBITUARY—

William Rae Young 54

MEDICAL APPOINTMENTS 54

MEDICAL APPOINTMENTS: IMPORTANT NOTICE 54

DIARY FOR THE MONTH 54

EDITORIAL NOTICES 54

THE INVESTIGATION OF THE IMMUNITY REACTIONS IN HYDATID DISEASE.

A PRELIMINARY REPORT.

BY K. DOUGLAS FAIRLEY, M.D.,
(From the Walter and Eliza Hall Institute of Research, Melbourne.)

IN Australia hydatid disease is still fairly frequently seen. It is associated with a high mortality.

From 1908 to 1923 fifty-eight (19.1%) of three hundred and three patients admitted to the Melbourne Hospital with this disease died.

The correct diagnosis had been made only in ninety-eight (43.7%) of two hundred and twenty-four of these patients before operation. Early diagnosis obviously results in better treatment and the present investigation was undertaken to find if any test less complicated than the complement fixation reaction could be found to aid the physician in the diagnosis of this disease. The value of this complement fixation test in the diagnosis of echinococcal infestation has recently been emphasized by N. Hamilton Fairley.[1]

The absolute count of the eosinophile leucocytes, the precipitin test and the Casoni intradermal reaction were investigated in a series of patients suffering from hydatid disease.

The results of this research are summarized in this paper.

THE LEUCOCYTOSIS OF HYDATID DISEASE.

As is well known, a definite eosinophilia is a frequent though by no means a constant finding in echinococcal infestation. Welsh and Barling[2] investigated this problem and their main conclusions coincide with the findings in this series of cases.

The upper limit of the normal eosinophile count may be taken as 300 per cubic millimetre.

Table I. shows the results of the investigation of the absolute count of the eosinophile leucocytes in these cases.

It is seen from this table that well developed eosinophilia (over 500) was present in about one-third of the patients before operation, while in 56.5% there was a slight or definite eosinophilia (over 300).

The highest eosinophile count in the series was found in a patient whose blood was taken towards the end of operation. As in so many patients suf-

TABLE I.
THE EOSINOPHILE COUNT IN HYDATID DISEASE.

Number of Eosinophile cells per cubic millimetre.	Before or at Operation.		After Operation.		
	Non-Suppurating Cysts.	Suppurating Cysts.	One Day.	Two Weeks.	Months
0-300	6	4	2	2	4
300-500	4	1	0	0	1
500-2,500.. ..	6	1	0	0	0
Over 2,500 ..	1	0	0	0	0
Total ..	17	6	2	2	5

fering from hydatid infestation the preoperative diagnosis in this instance was gall stones, but the finding of a daughter cyst in the common bile duct led to further exploration which revealed the ruptured hydatid cyst.

The blood when first examined showed 39.3% of eosinophile cells in a total count of 28,750, *id est* 11,300 eosinophile cells per cubic millimetre, while thirty hours later there were 5,850 eosinophile cells per cubic millimetre.

Eosinophilia is by no means a constant finding, yet blood examination will in many doubtful cases give valuable information and hence it should not be neglected. A glance at a blood film would have saved one girl from an unnecessary cholecystostomy a short time before the abdomen was reopened to drain an infected hydatid cyst. In this instance blood examination showed the presence of 13% (1,450) eosinophile cells. Also a blood examination may give the necessary confirmatory evidence in those infrequent instances in which the serological and the intradermal tests still leave the diagnosis in doubt. One man in whom inconclusive serological reactions were obtained, showed an eosinophilia of 9.4% (1,175). A suppurating cyst of the lung was found.

No correlation was observed between the presence or absence of an eosinophilia and the results of the other tests in these hydatid patients.

The examination of the blood for evidence of eosinophilia should never be neglected if the diagnosis is in doubt. The absence of an increase in the eosinophile cells is of no significance, but a definite eosinophilia especially in adults is of decided value, though the other causes of eosinophilia must also be kept in mind.

THE PRECIPITIN TEST IN HYDATID DISEASE.

The precipitin test was applied to the investigation of cases of hydatid disease by Fleig and Lisbonne[3] in 1907, while Welsh, Chapman and Storey[4] in the next couple of years modified the test, though it still remained useful only in the laboratory, as there was no means of preserving the antigenic properties of the fluid for any considerable length of time. The fluid used as an antigen by these observers was obtained from hydatid cysts found at operation on human patients and before use the fluid was passed through a Chamberland filter. Magath[5] in 1921 could find in the literature only thirty-seven proved cases of hydatid diseases in which this test had been performed and in 78.4% of these a positive result was obtained.

In reinvestigating this test two problems of first importance had to be solved. In the first place it was necessary to find a means of preserving the antigenic properties of the hydatid fluid over a period of months at least. Secondly it was necessary to prevent or overcome infection of the serum and fluid so that the final readings could be made after a moderately long interval and the sensitiveness of the test be thus increased.

Both these problems were solved by the addition of one volume of a 5.0% solution of carbolic acid to ten volumes of hydatid fluid freshly obtained under sterile conditions from the uncomplicated hydatid cysts of the liver and lung of infested sheep. The use of this carbolized fluid as antigen prevented infection of the reagents from interfering with the results of the test and the final readings could then be made with safety in from thirty to thirty-six hours. The sensitiveness of the antigen was increased and it was found that a good antigen would retain its antigenic properties for at least six months after preparation.

As this antigen is so satisfactory, no attempt has as yet been made to see if other chemicals would give even better results, though this problem requires investigation.

N. Hamilton Fairley[1] has shown that in the complement fixation test the antigenic value of hydatid fluid is in some way related to its content of scolices. At present the value of a carbolized saline extract of scolices as an antigen for the precipitin test is being investigated.

The Basis of the Reaction.

The precipitin reaction in echinococcal infestation is a specific reaction dependent on the presence of specific antibody in the blood of patients who have been absorbing antigen from hydatid cysts.

The Technique Used in the Test.

The Antigen.

Various antigens have been compared, but the most satisfactory one is the carbolized antigen mentioned above. It is easily prepared in bulk. The livers and lungs of infested sheep are brought direct from the abattoirs to the laboratory, the wall of the cyst is painted with a suitable antiseptic and a sterile "Record" syringe needle of fairly large bore is inserted. The clear fluid as it escapes from the cyst is collected in sterile glass receptacles and to every ten volumes of the clear hydatid fluid one volume of 5.0% solution of carbolic acid is added. The mixture is well shaken and is then stored on ice until required for use. It will preserve its antigenic properties for at least six months. There has been no opportunity to test it over a longer period. Needless to say degenerated or infected cysts are useless for the purpose of procuring suitable fluid.

Blood from the Patient.

Blood is obtained by venous puncture. It is preferred fresh, but, if it is sterile and is kept on ice, satisfactory results are obtained over a period of a week or longer. The clear serum is removed with a sterile pipette or preferably is poured off and centrifuged at a moderate speed to remove the red blood corpuscles.

The Test.

The exact proportions of serum and of antigen which give the maximum precipitate, vary with the particular antigen and the individual serum, but it has been found from numerous observations that approximately equal parts of serum and antigen give very satisfactory results. As there is this range of variation, absolute exactness of measurement of the amounts of serum and antigen is unnecessary. It is sufficient to use approximately equal quantities.

The test has been performed in small tubes of narrow bore similar to those used for the macroscopic agglutination tests. They are carefully cleaned and sterilized before use, otherwise small particles may be washed off the sides of the glass and suggest the presence of a fine precipitate or gross infection may lead to a somewhat similar result. These tubes usually have a capacity of about 0.8 to 1.0 cubic centimetre. More capacious tubes might with advantage be used, but it is desirable to have them of fairly narrow bore, so that the amount of the resultant precipitate may be easily seen in the bottom of the tube. The carbolized fluid is first added with a sterile pipette until the tubes are half filled (usually about 0.4 cubic centimetre) and then the sera to be tested are added till the tubes are full. No shaking is required. The serum gradually makes its way to the bottom.

Adequate controls are essential. These are as follows:

(*i.*) The same serum is mixed with an equal amount of carbolized saline solution (*id est* 0.45% solution of carbolic acid in normal saline solution).

(*ii.*) The antigen is mixed with an equal amount of normal saline solution (0.85%).

(*iii.*) A serum which is known not to yield a precipitate in this test, is mixed with an equal amount of the antigen.

(*iv.*) In addition a serum known to yield the reaction is also used, if it is available.

The tubes are left on the desk at room temperature and in thirty to thirty-six hours the final reading is made. Room temperature seems to give the optimum reaction. In the incubator or the water bath at body temperature or in the ice chest the results are not so satisfactory. If the serum be heated to 56° C. before use, the reaction is abolished.

Reasonable care must be taken to prevent the occurrence of gross infection.

The fluid and the serum are added to the tubes by a pipette which is rinsed in normal saline solution, then in boiling water and lastly in sterile normal saline solution each time after it is used.

Not infrequently in less than two hours, especially in the case of recent suppuration of a cyst, a definite macroscopic precipitate is present, but the final readings are usually made in thirty to thirty-six hours.

The typical precipitate first appears as a haze which gradually becomes defined as a very fine precipitate and is usually observed a little distance below the top of the tube. The separate particles are more easily seen on rotating the tube to and fro in the fingers, the particles being seen in motion for a moment after the tube stops. At this stage the examination is facilitated by using a magnifying lens and looking at the tube (after it has been dipped for a moment into moderately hot water in order to cause the particles to move by convection) against the background given by a dark window blind. Gradually the particles coalesce and sink until finally they are practically all grouped at the bottom as a fairly heavy, flocculent, easily-visible, white precipitate.

The results are usually recorded as "P+++," "P++," "P+" and "no reaction." A "P+++" reaction is shown by a heavy white flocculent precipitate at the bottom of the tube sometimes 0.6 centimetre (a quarter of an inch) in depth. A "P++" reaction is indicated by a less definite precipitate at the bottom of the tube with many coarse particles of precipitate still scattered through the tube. A "P+" reaction shows practically no precipitate at the bottom, while a certain amount is scattered through the tube and is definitely visible to the naked eye, though it is best seen as a diffuse, fine granularity with a lens after the tube has been momentarily dipped in moderately hot water. It is in these instances that the presence of adequate controls is so necessary. Unless the controls are absolutely clear, it is very difficult to interpret the "P+" reading. In this series of cases there have been three "P+" readings in patients probably not infected with hydatid, though it is of course impossible to exclude latent hydatid disease in these patients. In the presence of these rather indefinite results it is advisable to repeat the test on another occasion.

Carbol saline solution containing various strengths of carbolic acid when mixed with serum may cause a precipitate to appear in thirty to thirty-six hours when the strength of the carbolic exceeds 0.75%, though it is uncommon until the carbolic acid is stronger than 1.0%.

Very rarely a little fine precipitate may occur in thirty to thirty-six hours with 0.45% carbolized saline solution, hence the necessity of an adequate control of the serum with carbolized saline solution.

Usually all that may be observed is a non-progressive, faint opalescence of the upper portion of the tube.

An increase in the strength of the carbolic acid in the hydatid fluid used as antigen likewise leads to the formation of these precipitates, hence it is inadvisable to use a strength of carbolic acid greater than 0.45% in the fluid. Under these circumstances pseudo-positive results will not be recorded, though it is always essential to have adequate controls.

The somewhat discoloured precipitate due to an increased strength of carbolic acid is easily distinguished from a true precipitate, for in the former a characteristic appearance is presented by the largest particles accumulating at the top of the tube, while the finer particles spread downwards for a varying distance. Only rarely do the particles accumulate to a considerable extent at or near the bottom of the tube.

Likewise when infection occurs, the opalescent haze first appears at the top of the tube and gradually extends downwards until finally a precipitate is observed. Though this occurs not infrequently when untreated fresh fluid is used as an antigen, it is not seen when the carbolized antigen is used, provided that reasonable care is taken to prevent gross contamination of the tube and its contents.

To sum up, approximately equal amounts of the carbolized fluid and the serum are placed in a tube which, together with the requisite controls, is left on the desk at room temperature for thirty to thirty-six hours before the final reading is made. No special skill or training is required to do the test and the only difficulty is in the reading of the "P+" reactions which after all form only a small proportion of the positive results.

A Comparison of Different Antigens.

Various antigens were used in this investigation. In a few instances an alcoholic extract of scolices in a dilution of one in ten was tried with unsatisfactory results. Pseudo-positive findings were not uncommon, while in definite hydatid disease reactions were frequently not obtained.

Fluid from hydatid cysts of both man and sheep was passed through a Berkefeld filter and compared as regards antigenic properties with the fresh unfiltered fluid from the cysts of sheep. The superiority of the fresh fluid of the sheep is shown in Tables II. and III. These investigations with the human fluid extended over a period of three months during which time the fluid showed a marked decrease in its antigenic powers.

TABLE II.

A COMPARISON OF FRESH HYDATID FLUID FROM SHEEP WITH FILTERED FLUID FROM MAN.

Antigen.	Total Number.	"P+++"	"P++"	"P+"	No Reaction	Percentage of Positive Reactions.
Fresh Fluid.. (sheep)	25	13	5	2	5	80.0%
Filtered Fluid.. (man)	25	4	1	7	13	48.0%

TABLE III.

A COMPARISON OF FRESH AND FILTERED HYDATID FLUID FROM THE SHEEP.

Antigen.	Total Number.	"P+++"	"P++"	"P+"	No Reaction	Percentage of Positive Reactions.
Fresh Fluid..	12	6	2	2	2	83.3%
Filtered Fluid..	12	1	2	4	5	58.3%

The fluid was obtained from two patients and it is interesting to note that shortly after operation, though the serum of each yielded a "P+++" reaction with fresh sheep's fluid, there was in both only a "P+" reaction with the patient's own and with each other's fluid.

From Tables II. and III. it is obvious that as compared with filtered fluid from man or sheep fresh fluid from the sheep not only gives a much higher percentage of positive results in the presence of hydatid, but also gives much stronger reactions, for there were comparatively few of the "P+" reactions with the fresh fluid. In the next few months fresh fluid obtained from the cysts of the sheep was compared with similar fluid after carbolic acid had been added as described above.

Table IV. shows the results of this examination on twenty-three proved and two probable cases of hydatid disease and illustrates the advantage of the carbolized fluid as compared with the fresh fluid of the sheep. In some of these tests where there was not enough fresh fluid to enable any to be carbolized, fluid which had been carbolized from a week to a couple of months before, was used.

TABLE IV.

A COMPARISON OF FRESH AND CARBOLIZED FLUIDS AS ANTIGENS.

Antigen		"P+++"		"P++"		"P+"		No Reaction		Percentage of Positive Reactions.
Fresh Fluid	Proved Infestation ..	12	13	3	3	4	4	4	5	80%
	Probable Infestation ..	1		0		0		1		
Carbolized Fluid	Proved Infestation ..	16	17	4	5	3	3	0	0	100%
	Probable Infestation ..	1		1		0		0		

On no occasion did the fresh fluid prove superior to the carbolized fluid as an antigen. Obviously the carbolized hydatid fluid of the sheep is at present the best available antigen for the precipitin test. It is a sensitive and stable antigen with which to perform a very simple and reliable diagnostic test in hydatid disease.

The Value of the Precipitin Test in Diagnosis.

Of two hundred and twenty-four cases of hydatid disease in the wards of the Melbourne Hospital from 1908 to 1923 only ninety-eight (43.7%) were correctly diagnosed and in many of these the diagnosis was suggested by the history of the patient either in regard to previous operation for this trouble or coughing up the contents of a cyst. Table V. shows the preoperative diagnosis in proved and probable instances of hydatid disease and also in

cases of proved recurrence of the disease before the next operation was performed. The results in a series of tests in which fresh fluid was used may be compared with those of another group in which carbolized fluid was used as an antigen.

TABLE V.
THE PREOPERATIVE DIAGNOSIS OF HYDATID DISEASE BY THE PRECIPITIN TEST.

Fresh Fluid.	Total Number.	"P+++"	"P++"	"P+"	No Reaction	Percentage of Positive Reactions.
Proved Infestation ..	14	9	1	2	2	85.7%
Probable Infestation ..	7	3	2	0	2	—
Proved Recurrent Infestation ..	3	1	0	0	2	—
Total ..	24	13	3	2	6	75.0%

Carbolized Fluid.	Total Number.	"P+++"	"P++"	"P+"	No Reaction	Percentage of Positive Reactions.
Proved Infestation ..	17	9	2	3	3	82.4%
Probable Infestation ..	5	2	2	0	1	—
Proved Recurrent Infestation ..	4	2	2	0	0	—
Total ..	26	13	6	3	4	84.6%

This table illustrates the value of the precipitin test in the preoperative diagnosis of this disease and also gives further proof of the advantage of the carbolized fluid as an antigen.

Since Ghedini[6] first applied the complement fixation reaction to the diagnosis of hydatid disease, many observers have shown its value in this respect. While this investigation was in progress Dr. S. W. Patterson and Miss F. E. Williams have been examining the sera of these patients by the complement fixation test and they have kindly allowed me to make use of their results.

In Tables VI. and VII. the serological reactions—precipitin and complement fixation in proved and probable cases of hydatid disease are compared.

TABLE VI.
A COMPARISON OF THE RESULTS OF COMPLEMENT FIXATION AND PRECIPITIN REACTIONS—FRESH FLUID BEING USED AS ANTIGEN.

Test.	Total Number.	"P+++"		"P++"		"P+"		No Reaction		Percentage of Positive Reactions.
COMPLEMENT FIXATION TEST—										
Proved Infestation ..	61	34	37	3	5	12	14	12	13	81.2%
Probable Infestation ..	8	3		2		2		1		
PRECIPITIN TEST—										
Proved Infestation ..	61	29	33	8	10	9	9	15	17	75.4%
Probable Infestation ..	8	4		2		0		2		

TABLE VII.
A COMPARISON OF RESULTS OF COMPLEMENT FIXATION AND PRECIPITIN REACTIONS—CARBOLIZED FLUID BEING USED AS ANTIGEN.

Test.	Total Number.	"P+++"		"P++"		"P+"		No Reaction		Percentage of Positive Reactions.
COMPLEMENT FIXATION TEST—										
Proved Infestation ..	62	33	35	4	7	8	9	17	19	72.9%
Probable Infestation ..	8	2		3		1		2		
PRECIPITIN TEST—										
Proved Infestation ..	62	32	36	10	12	10	10	10	12	82.9%
Probable Infestation ..	8	4		2		0		2		

The complement fixation test in this series was done by the Harrison method and with the use of fresh hydatid fluid from the sheep as antigen.

In addition to the cases tabulated above the serum of three patients probably free from hydatid disease yielded a "P+" precipitin reaction and failed to react to the other test, while that of another with actinomycosis yielded a "P+++" complement fixation reaction and failed to react to the precipitin test.

The serum of one other patient whose history is unknown, gave a "P+++" precipitin response and failed to react to the complement fixation test. These are omitted from the tables. It is impossible to exclude echinococcal infestation in these patients.

The interpretation of the "P+" readings in both tests is somewhat difficult and often there is some hesitation about making a definite diagnosis of hydatid disease in a patient giving this response. In these circumstances it is usual to repeat the test before forming a definite conclusion. The number of these "P+" reactions in the series of examinations recorded above is practically identical in the two tests.

It is seen from Tables VI. and VII. that the serological reactions in hydatid disease correspond very closely and this is especially marked when carbolized fluid is used as an antigen for the precipitin test. Several examinations were often made on the same patient before and after operation, but as the same sample of blood was always subjected to both tests, an accurate comparison of the relative value of these methods is possible.

The Specificity of the Precipitin Test.

The precipitin test is absolutely specific. Over two hundred and seventy sera have been examined from patients in whom there was no evidence of hydatid disease and not a single definite pseudo-positive reaction was obtained. In three instances a "P+" reaction was recorded, but in these it was impossible to disprove the presence of a latent cyst. Unless attention is paid to the details of the technique of the test, pseudo-positive "P+" results will be common. These arise in three ways:

(*i.*) The tubes used for the test are not clean and particles washed off the sides of the glass may give the appearance of a "P+" reaction. This is easily avoided.

(*ii.*) When the fresh, untreated fluid is used, infection frequently leads to the appearance of a slight reaction. The typical appearance of this false precipitate has already been described. When carbolized fluid is used as an antigen, provided that reasonable care is taken to prevent gross contamination of the serum or fluid, this factor in the production of pseudo-positive results becomes negligible.

(*iii.*) Increasing the strength of the carbolic acid in the fluid leads to the formation of a characteristic precipitate mainly confined to the upper portion of the tube. Such a false precipitate is easily recognized and its formation is avoided by careful preparation of the antigen.

The Stability of the Antigen.

That the carbolized fluid retains its antigenic properties over a long period of time is shown by the fact that nearly six months after the preparation of one carbolized antigen, strongly positive ("P+++") results were obtained with the serum of four patients proved to be suffering from hydatid disease, the precipitate appearing in two instances within two hours. Twenty-one sera of patients with hydatid disease examined with a particular sample of fluid over a period of two months after its preparation yielded a positive reaction in nineteen instances and failure to react in two.

In numerous instances positive results have been obtained with carbolized fluid from two to five months old. The fluid must, of course, be quite satisfactory when originally prepared, for it does not apparently improve with age, though a good antigen will retain its antigenic properties for many months.

Factors Modifying the Precipitin Test in Hydatid Disease.

The factors modifying the precipitin test are identical with those modifying the complement fixation test in this disease and these factors have been considered in detail by N. Hamilton Fairley.[6] They are:

(*i.*) The lack of antigenic properties in the fluid of the cyst. This probably is the explanation of the failure to obtain a precipitin reaction in one patient a few weeks after operation. The fluid from the cyst was useless as an antigen for either complement fixation or Casoni tests, but unfortunately none was available to use for the precipitin reaction.

(*ii.*) The absorption of the antigen which varies with the condition of the cyst.

The patient mentioned above was operated on three weeks later and another thick walled cyst just commencing to degenerate was found. A fortnight after operation a positive reaction was obtained to the precipitin test showing that deficient absorption of antigen from the thick walled cyst was the cause of the previous failure to react.

Rupture into a body cavity or recent suppuration leads to greatly increased absorption of antigen. All six patients with suppurating cysts examined before operation showed positive precipitin reactions, the precipitate in some instances being very obvious in less than two hours.

On the other hand complete rupture with evacuation of the cyst contents to the exterior (*exempli gratia* a pulmonary hydatid cyst rupturing into a bronchus and being coughed up) or chronic suppuration or degeneration leading to total destruction of the cyst may lead to failure to react because of the disappearance of the antigen. In two patients with ruptured pulmonary cysts examined two weeks and a year respectively after rupture of the cyst no reaction was obtained, while in one patient with a suppurating cyst the reaction failed to occur repeatedly from the day after operation onwards. There had been no opportunity to examine the serum before operation.

In three patients whose cysts were removed whole without any interference with the cyst contents, the reactions before operation remained unaltered after operation which necessarily did not lead to any increased absorption of antigen. In two of these a positive reaction occurred and in the third there was no reaction.

One patient whose serum failed to yield a reaction to this test a week after operation, developed a positive reaction in the following week, while an instance has already been quoted in which no reaction occurred before operation and a positive reaction was obtained within a fortnight of surgical interference. In these cases, the escape of some hydatid fluid at operation led to the absorption of more antigen with the resultant positive reaction to this test within a fortnight.

On the other hand, of three patients with strongly positive "P++++" reactions before operation, in two the reaction was only slightly positive ("P+") two months after operation and in the third no reaction was obtained. Possibly these patients have no further hydatid cysts, though it is too early to make any certain statement on this subject.

Table VIII. shows the results of the examination of the sera of twenty-seven patients with hydatid disease at various intervals after operation.

TABLE VIII.

THE POST-OPERATIVE RESULTS OF THE PRECIPITIN TEST.

Time after Operation.	Total Number.	Positive.	No Reaction.
0—3 Months	15	12	2(1)
3—12 Months	6	5	1
1—2 Years	2	2	0
2—6 Years	4	3	1
Total	27	22	4(1)

The figure in parentheses (1) indicates that this patient has since been operated on for further hydatid cysts (this was the fluid with poor antigenic properties).

Before definite conclusions of any value can be drawn from this table, these patients will have to be followed over a period of several years.

(*iii.*) Failure of the defensive mechanism of the host. One patient in this series failed to give a positive result to any of the hydatid tests. A few days later he died from toxæmia resulting from chronic osteo-myelitis of the femur.

As the fluid from the cyst was a satisfactory antigen for the precipitin test, the failure to obtain a reaction in this case was probably due to a failure on the part of the patient to respond to the antigen by the production of specific antibody. Deficient absorption of antigen from the cyst cannot, however, be excluded.

The precipitin reaction is a simple and efficient test for the presence of hydatid disease. The modified test as described above apparently gives as reliable results as the complement fixation test, while it has numerous advantages over this more complicated test. A stable antigen has been obtained and by the use of this test the practitioner himself may make the diagnosis within thirty-six hours in the majority of doubtful cases of hydatid disease. In the country the antigen could easily be made by the medical practitioner, while it should be possible for the manufacturing chemical firms to place this antigen on the market. The efficiency of such an antigen would need to be determined by testing it against the serum of a patient (or of a sheep which would probably be equally satisfactory) suffering from known hydatid disease. This is necessary as different fluids vary greatly in their antigenic properties and the success of the test depends on the use of a good antigen.

THE INTRADERMAL TEST OF CASONI.

From 1912 to 1914 Casoni[7] published the results of his investigations of the cutaneous reaction to hydatid fluid in patients harbouring the echinococcus. With a technique similar to that of the von Pirquet test in tuberculosis indefinite results were obtained. Satisfactory reactions were obtained by the intradermal injection of 0.5 cubic centimetre of filtered hydatid fluid which had been prepared by the addition of one drop of pure phenol to twenty cubic centimetres of the fluid. Of twenty-five patients sixteen failed to show reactions, positive reactions were obtained in seven and in one patient a pseudo-positive reaction was obtained. This pseudo-positive reaction was probably due to the fact that normal saline solution had been used as a control and not carbolized saline solution of the same strength of carbolic acid as was in the hydatid fluid.

Extracts of hydatid membrane gave less satisfactory results.

Testi and Zoli[8] found a positive reaction in every one of thirty patients with hydatid disease. They suggest that when no reaction is obtained, exploratory puncture is justified. Though in these circumstances anaphylactic symptoms will probably be absent, there is always the risk of a secondary sowing of further cysts following such a puncture, while in the lung there is the danger of rupturing the cyst and causing asphyxia of the patient.

Luridiana[9] using fluid preserved with chloroform found a positive Casoni reaction in seven out of ten patients with hydatid disease, while Gasbarrini[10] obtained positive results in eleven out of twelve patients, the exception being in the case of a suppurating cyst.

In the present investigation the fluid used for injection was collected fresh from cysts of the livers and lungs of sheep or from the cysts of patients at

operation and immediately passed through a Berkefeld filter and stored in sterile glass ampoules or vaccine bottles in the ice chest. No chemicals were added to the fluid which has been found to give satisfactory results as long as seven months after preparation. There has been no opportunity of testing fluid kept for a longer period.

The Technique of the Intradermal Test.

The skin of the outer side of the arm about midway between the elbow and the shoulder is cleansed with spirit and 0.5 cubic centimetre of the fluid is injected intradermally. The typical orange skin appearance shows that the injection is being given into the skin and not subcutaneously. A control test is essential and 0.5 cubic centimetre of normal saline solution (0.85%) is injected into the skin of the other arm at about the same site. In this way it is possible to observe how much reaction is due to the trauma of the injection. If necessary a further control may be done by injecting 0.5 cubic centimetre of the fluid into a patient presumably free from hydatid disease.

The Typical Reaction.

The typical reaction shows itself within a few hours as an erythematous wheal at the site of injection, frequently accompanied by pruritus. Subsequently an œdematous infiltration of the part occurs with a local rise of temperature. In eighteen to twenty-four hours the classical signs of inflammation with the exception of pain and tenderness are usually present. Redness is generally evident, though it may be absent. As a rule there is an œdematous infiltration of the skin round the site of inoculation with a surrounding zone of erythema and just at the edge of this area capillary injection may be observed.

In forty-eight to seventy-two hours the reaction has usually faded, though occasionally in the more severe types it may persist for nearly a week. Sometimes an excessive reaction may cause concern by simulating erysipelas or cellulitis. In these cases there is local heat and redness, while œdema is present and may extend from the shoulder to the hand. Often there are a few vesicles at the site of inoculation. But pain and tenderness are practically absent, while the axillary glands are neither enlarged nor tender and there is a definite absence of any general symptoms, such as fever, rapid pulse, headache and so on. In a few days without any treatment the whole thing subsides.

Sometimes in patients who have been operated on either a short time previously or many years before, and occasionally when suppuration has occurred in the cyst, an abortive type of reaction is seen. Within a few minutes a definite wheal appears with a distinct zone of redness around it, suggesting that the reaction will be strongly positive. Within an hour or so it may fade completely or while the erythema may persist, there is no development of the characteristic infiltration which denotes a positive reaction. Such an abortive type of response is for the present best recorded as a doubtful reaction. The true absence of reaction is shown by the rapid subsidence of the orange skin appearance which results from the injection, so that in a short time the site of inoculation is difficult to find apart from the mark of the needle.

Numerous observations have been made on patients free from hydatid disease without any pseudo-positive results being recorded. The test is apparently as specific as the complement fixation or precipitin reactions.

The results of these tests were recorded as positive, doubtful and no reaction. The significance of the last two has already been explained. The final readings are usually made about twenty-four hours after injection.

A slight positive reaction is shown by the appearance of some infiltration over an area about the size of half a crown, usually with a surrounding zone of erythema.

In these cases the saline solution control is essential for an accurate reading, as some induration may follow the trauma of the injection in certain patients. All grades of positive reaction occur from this slight positive response up to those intense reactions simulating erysipelas or cellulitis with redness and œdema extending from the shoulder to the hand.

Microscopically the typical positive reaction shows an interesting picture. A section of the skin of a patient was obtained at operation, the intradermal test having been performed some six hours previously. The reaction macroscopically was not intense. Microscopical examination showed the connective tissue bundles of the corium widely separated by lymph exudation, while there was very marked infiltration of the subcutaneous tissue and of the corium with enormous numbers of eosinophile cells, a whole field (oil immersion lens) frequently being thickly packed with these cells identical in all respects with the eosinophile leucocytes. In one or two instances in which a blood examination has been made after an intradermal injection of the fluid, there has been a definite eosinophilia. So far, however, there has been no opportunity since this fact was observed of comparing the blood counts of the patient before the injection and at the height of the reaction. Probably in many instances a considerable increase of the number of circulating eosinophile cells would be found at some time after the injection. There is at any rate a very definite local accumulation of eosinophile cells.

The Fluids Used in the Test.

Only filtered fluids from man and from the sheep have been used in this investigation. Different fluids vary considerably in their usefulness for this test. The fluid from one patient was absolutely useless, for reaction consistently failed to occur with this fluid, while other fluids from one man and from sheep led to positive findings. In the few cases in which human and sheep fluids were compared, there was little difference in result provided the fluid was at all satisfactory. These findings are recorded in Table IX.

TABLE IX.

THE CASONI REACTION WITH FLUID FROM MAN AND FROM SHEEP.

Antigen	Total.	Positive.	Doubtful.	No Reaction.
Human Fluid ..	17	11	1	5
Sheep Fluid ..	17	12	0	5

The main advantage of the sheep's fluid lies in the large supply available. This fluid will retain its usefulness for many months at least. No investigation has so far been made to find whether any other means of preparation of the fluid, such as the addition of chemicals, would give better results.

The Results Obtained with the Intradermal Test.

Altogether sixty-seven patients with proved hydatid disease and four probably infested with the echinococcus have been examined at various stages of the disease. Five of the patients with proved hydatid infestation gave reactions which varied on the two occasions on which they were examined, hence Table X., which shows the sum total of these investigations, includes the results of seventy-two tests on sixty-seven patients with this disease.

TABLE X.

THE RESULTS OF THE CASONI TEST IN HYDATID DISEASE.

Infestation.	Total Number.	Positive Reaction	Doubtful Reaction	No Reaction	Percentage of Positive Reaction.
Proved ..	72(67)	40	3	29	55.5%
Probable ..	4	4	0	0	—
Total ..	76	44	3	29	57.9%

Factors Modifying the Casoni Reaction.

Fifteen patients with proved and five with probable echinococcal infestation were subjected to this test before there was any operative interference with the cysts. The results of these tests are shown in Table XI.

Complications Outside the Cyst.

The frequency of complications in this series of cases makes the reaction appear less valuable in the preoperative diagnosis of hydatid disease than is really the case.

It is seen from Table XI. that only one of three patients with uncomplicated cysts gives a positive Casoni reaction. The two failures to react are explained by the fact that one patient was to die in a few days from chronic osteo-myelitis of the femur and all his energies were directed towards resisting the coccal infection. In this patient the serological tests also failed to produce a reaction. The other

TABLE XI.

THE CASONI AND COMPLEMENT FIXATION REACTIONS IN THE PREOPERATIVE DIAGNOSIS OF HYDATID DISEASE.

Infestation.	Casoni.			Complement Fixation.		
	Total Number.	Positive Reaction	No Reaction	Positive Reaction	No Reaction	Not Examined.
PROVED HYDATID WITH CYSTS—						
(i.) Normal ..	3	1	2	1	1	1
(ii.) Degenerated	2	1	1	1	1	0
(iii.) Ruptured (lung) ..	4	2	2	1	3	0
(iv.) Suppurating	6	0	6	5	1	0
PROBABLE HYDATID ..	5	4	1	4	1	0
Total ..	20	8	12	12	7	1

patient had multiple abdominal cysts and probably had absorbed so much antigen from these numerous cysts that she had become desensitized. The majority of observers are unanimous in stating that a very large proportion of patients with uncomplicated hydatid disease show a positive Casoni reaction before operation.

Only two facts of importance are shown in Table XI.

The first of these is that the results of the Casoni and complement fixation tests do not necessarily correspond in these instances. It has been shown before that the precipitin and complement fixation tests are practically always identical in various patients with hydatid disease. As a patient who has failed to react to either of these serological tests, may give a positive Casoni reaction and *vice versa*, it is possible by combining the intradermal test with either of the serological reactions to diagnose the vast majority of cases of echinococcal infestation.

Complications Inside the Cyst.

The other point of importance is that the presence of any complication in the cyst (suppuration, degeneration or rupture) may lead to an absence of reaction to the Casoni test.

The patients with suppuration of the cyst usually show the most intense serological reactions (provided the suppuration is not of very long duration). It is often possible therefore to diagnose the presence of a suppurating hydatid cyst in a particular patient by the fact that a heavy precipitate appears in a few hours with the precipitin test, while the Casoni reaction fails to produce a reaction.

The Italian authors suggest that the failure to react to an intradermal test in these patients is due to the destruction of the parasite and that this prevents the further absorption of antigen. This may be partly responsible for the failure to react to this test in those cases of long standing suppuration in which the serological tests also failed to produce a reaction. In those patients, however, who show strongly positive serological reactions, the failure

to react to the Casoni test is probably due to a temporary desensitization from the absorption of an excessive amount of antigen following the hyperæmia associated with inflammation in the cyst.

Degeneration of the cyst results in the absence of antigen and may lead to a failure to react to this test as in one of the two patients with degenerated cysts in this series.

Rupture of the cyst into a body cavity may lead to the absorption of a large amount of antigen with temporary desensitization of the patient. Where the cyst ruptures externally or into a bronchus and is rapidly coughed up, there may be so little absorption of antigen that the reaction remains positive.

Operative Interference.

Another important factor modifying the response to this test is operative interference. The type of operation is of the greatest importance.

In five patients in this series the cysts were able to be removed whole without any interference with the cyst contents and thus without any absorption of antigen. All five patients examined a few days after operation showed strongly positive reactions to this test. On the other hand, whenever it is necessary to open the cyst at operation it is invariably found that the reaction to the Casoni test in these patients in the first few days after operation is either absent or only slightly positive. After a fortnight the reaction begins to reappear and after two months in a large proportion of cases the reaction is strongly positive. Table XII. illustrates the results of this test after surgical interference with the cyst contents.

TABLE XII.

THE CASONI REACTION AFTER OPERATION.

Time interval after Operation	Total Number.	Strongly Positive Reactions	Slightly Positive Reactions	Doubtful Reactions	No Reaction
0 to 2 weeks ..	11	0	3	2	6
2 weeks to 2 months ..	10	5	0	1	4
2 months to 25 years	36	16(10)	2	0	3(5)
2 months to 1 year	11	8(2)	0	0	0(1)
1 to 2 years ..	7	4(0)	0	0	1(2)
2 to 5 years ..	7	4(2)	1	0	0(0)
5 to 25 years..	11	0(6)	1	0	2(2)

The figures in parentheses under the heading "Strongly Positive" mean that these patients have all been subjected to another operation for hydatid disease since they were subjected to the Casoni reaction.

The figures in parentheses under the heading "No Reaction" mean that these patients clinically and by serological tests or by investigation at operation or *post mortem* show evidence of further cysts.

No reliance therefore can be placed on a failure to react to the Casoni test even months or years after the original operation for hydatid. One patient who failed to react twenty-five years after the operation for hydatid disease was found *post mortem* to have a hydatid cyst of the liver. Of the three patients who failed to react to this test and in whom evidence of further infestation has not been obtainable, one at the original operation was found to have a fluid devoid of any antigenic properties as far as the complement fixation reaction was concerned and all tests on this patient failed to produce a reaction. One of the other two patients has not been seen for more than a year.

Though a failure to react to the Casoni test after operation does not necessarily mean freedom from further infestation, a positive reaction, on the other hand, probably does not necessarily mean that further cysts are present. Of the thirty-six patients examined from two months to twenty-five years after operation only three failed to react to the Casoni test and show no evidence to date of further cysts being present. Though the figures are small it seems that the proportion of eleven to twelve is rather great to mean multiple infestation and incomplete removal of the cysts at operation. It is possible that very shortly after operation the patient becomes desensitized owing to the absorption of antigen liberated at operation (hence the persistent positive reactions where the cyst is removed whole) and that after a fortnight or so the patient begins to become sensitized again, while in about two months the greater proportion of the patients have become sensitized sufficiently to gively fairly marked reactions. Until these patients are followed over a period of years it is impossible to come to any definite conclusion as to the significance of these reactions after operation. But it may be stated that failure to react to the Casoni test even months or years after operation does not necessarily mean freedom from hydatid disease, while a positive reaction at this period after operation probably does not necessarily result from the presence of further cysts.

This test is an exceedingly simple one and should be within the reach of all practitioners. It is by no means infallible, but in patients seen before any operation for hydatid has been performed a positive test definitely means hydatid disease. In uncomplicated cysts the reaction is usually positive, but the presence of complications, especially suppuration, frequently leads to a failure to react. After operation has been performed on any hydatid cyst, great caution must be exercised in drawing any conclusions from the results of this test.

Theoretical considerations as to whether this reaction is a true anaphylactic one or not are outside the scope of this paper. The investigation of this aspect of the problem is being undertaken at present.

CONCLUSIONS.

(*i.*) The clinical diagnosis of hydatid disease is admittedly difficult while laboratory methods give great aid in the diagnosis.

(*ii.*) The complement fixation test in this disease

gives good results, but the two main disadvantages are:

(*a*) There is no stable antigen available so fresh antigen has to be obtained every couple of days.

(*b*) The technique of the test is very complex and special training in laboratory methods is necessary for this test to be satisfactorily performed.

(*iii.*) The modified precipitin test as described above gives results practically identical with those of the complement fixation test. An antigen that will keep satisfactorily for some months at least is readily prepared, while the technique of the test is so simple that it can easily be done without any special preliminary laboratory training. It is a test which may be done satisfactorily by every practitioner.

(*iv.*) The Casoni intradermal test bears no constant relation to the serological tests, but is a very useful test and often gives a positive reaction in patients with hydatid disease who have failed to react to the complement fixation and precipitin tests. It is very simple and may be used by every practitioner. The filtered fluid will keep satisfactorily for several months at least.

(*v.*) In those rare instances in which no reaction is obtained to all the above tests, useful information may sometimes be derived from the blood examination, the presence of an eosinophilia in such an instance occasionally clinching the diagnosis.

(*vi.*) These last three tests—the precipitin test, the Casoni test and blood examination—are within the reach of every practitioner and the use of these methods will result in correct diagnosis in at least 80% to 90% of patients with echinococcal infestation. The definite advantage of these tests over clinical examination alone is obvious.

ACKNOWLEDGEMENTS.

The investigation of the Casoni reaction was begun in conjunction with Dr. N. Hamilton Fairley, to whom I am indebted for permission to include the early results of this work in the present paper.

Dr. S. W. Patterson and Miss F. E. Williams have kindly allowed me to use the results of the complement fixation tests which they have performed on these patients, while Miss F. E. Williams in my absence has carried on the precipitin test in certain of these patients and has allowed me to make use of the results.

I would like in addition to express my thanks to these three observers for their help on numerous occasions throughout this investigation.

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Reports of Cases.

A CASE OF CEREBRAL ANEURYSM SIMULATING MENINGITIS.

BY SINCLAIR GILLIES, M.D. (London),
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THE subjoined case of cerebral aneurysm seems worthy of record on account of its close simulation of recurring meningitis, the unusual site of the aneurysm, its recurring rupture, the localization of the headache to a spot on the left frontal region (the side of the aneurysm) the youth of the patient, the signs of stimulation of the pituitary body shown by polyuria and glycosuria, the gradual evolution of the signs of chronic nephritis during eight years from a condition compatible with the diagnosis adolescent albuminuria, the absence of discoverable cause for the progressive renal and vascular involvement.

E. McK., a male, single, draper, *ætatis* twenty-two, when seen first on September 22, 1915, gave a history of headache and albuminuria for two years. He had lived in Townsville for sixteen years and had had scarlet fever, measles and rheumatic fever. His parents were healthy as were his brothers and sisters, excepting one who had died in childhood of "lead neuritis."

On examination he was found to be well nourished and healthy looking. His aortic second sound was accentuated; his systolic blood pressure was 140 millimetres; his liver edge was palpable; the specific gravity of his urine was 1,020 and it contained a thick cloud of albumin. No other abnormality was detected.

From repeated examinations of his urine during the next nine months it was noted that that passed on rising did not contain albumin or casts, while that passed later in the day contained a moderate cloud of albumin, hyaline and granular casts, leucocytes and a few red cells.

A skiagram revealed nothing abnormal. His blood pressure varied from 120 to 140 millimetres of mercury. His heart was normal in size. His headaches were less severe when he was wearing glasses. His health remained good

till October, 1920, when he was seized while driving a car in Townsville with sudden agonizing pain in the occipital and frontal region preceded by a hissing noise in the ears. He was taken home with difficulty. When seen next morning by Dr. Humphry he complained of intense pain in the head extending down the back and arms, especially the right. There was a distinct squint and Kernig's sign was present. Three days later lumbar puncture evacuated clear fluid under increased pressure, after which his headache was relieved and his symptoms began to abate. Examination of the fluid at the Tropical Institute showed no abnormality. From this time his temperature, at first normal, rose to 37.2° C. (99° F.). His pulse was rather rapid throughout. The symptoms gradually abated. Three weeks later when he was apparently convalescent, they recurred with great suddenness and severity. On this occasion lumber puncture evacuated no fluid. A Wasserman test applied to the blood serum did not provoke a reaction.

When I saw him five weeks later, on December 1, his neck and back were still rigid; his knee and ankle reflexes were absent, the plantar reflex was flexor and a well developed Kernig's sign was present. His optic discs appeared normal.

By the end of January he had apparently recovered, except that his ankle jerks could not be obtained and that on waking he complained of slight pain in the left frontal and occipital region. His apex beat was now in the nipple line; his systolic blood pressure was 140 millimetres; his urine contained a cloud of albumin and cellular and granular casts. Dr. F. A. Pockley reported that his eyes showed signs of albuminuric retinitis and slight remains of neuritis.

In March, 1920, his systolic blood pressure was 160 millimetres and in April, 180 millimetres. In February, 1923, it had risen to 200 millimetres. The diastolic pressure was 140 millimetres. He felt well except for the persistence of headache occurring at one spot above the left eye or at the back of the head. At this time his condition was considered to be chronic nephritis complicated by an intercurrent attack due either to meningitis or less likely to hydatid or tumour blocking the exit of the cerebro-spinal fluid from the fourth ventricle.

On March 14, 1923, at 7.30 a.m. he complained of violent headache and frequent micturition. When seen at 11 a.m. he was tossing restlessly in bed complaining of violent pain, mainly occipital. His pupils reacted, but both external recti were completely paralyzed. His neck was rigid, Kernig's sign was present, his knee jerks were not increased, there was a feeble extensor response in the left foot, but no response in the right. There was no sign of muscular weakness. He was passing a large quantity of urine frequently. This was loaded with albumin and reduced Fehling's solution in equal parts. A lumbar puncture done during the afternoon evacuated a few drops of clear fluid not under increased pressure. His condition remained unchanged for two days. Examination of his fundi revealed moderate swelling of the discs with many retinal hæmorrhages. On the seventh day his temperature rose and remained up five days, ranging from 39.4° to 37.2° C. (103° to 99° F.). On the seventh day lumbar puncture evacuated over thirty cubic centimetres of deeply blood-stained fluid under increased pressure. The fluid showed an excess of leucocytes, hæmoglobin, but no organisms. After the puncture his symptoms seemed relieved, but his pulse "went to pieces," ranging from 140-160 for the next twenty-four hours. His condition then steadily improved; he became more conscious, took an interest in his surroundings, complained considerably of pain in his back and limbs which he declared was the way his previous attack had left him. The squint, rigidity and Kernig's sign persisted. The plantar extensor reflex disappeared after the first day. On the ninth day it was noted that Kernig's sign was evident and the knee, ankle and plantar reflexes were absent in both legs. By the fifteenth day improvement was considerable. He was conscious and alert, but stiffness of neck, squint and Kernig's sign persisted. That evening he complained of sudden, severe pain and became unconscious at once. His pulse could not be felt and he stopped breathing. The pulse returned, but respiration ceased for five minutes and he became cyanosed. After artificial respiration and the administration of oxygen respiration returned and in about an hour he was semi-conscious, complained of pain in the back of the head, neck and lumbar region. Next day he was conscious, but unable to speak. Cheyne-Stokes breathing was present. He gradually lapsed into unconsciousness and died next morning.

Pathological Report.

The chief changes discovered at the autopsy are given below. The cerebral convolutions were flattened and vessels engorged. The cerebro-spinal fluid was blood-stained. At the base of the brain occupying the subarachnoid space was an extensive extravasation of blood forming a thick clot extending forward as far as the optic chiasma, laterally along the sides of the *pons Varolii* filling the cerebello-medullary space and extending over the lower portion of the cerebellum. The clot obscured and firmly embraced the nerves at the base of the brain and encircled the pituitary stem. On dissecting away the clot a small aneurysm was found on the left side of the medulla arising apparently near the origin of the anterior cerebellar artery from the vertebral. The aneurysm was ovoid, 1.2 by 1.4 centimetres; it was filled with clot, three-quarters of which was white and laminated, the remainder recent. In this area the wall was eroded and was the obvious cause of the hæmorrhage. The aneurysm had indented the left side of the lower part of the medulla about the region of the origin of the spinal accessory.

The spinal fluid contained blood and there was a small quantity of blood in the posterior cornua of the left lateral ventricle. The left vertebral artery was small and had apparently been compressed by the aneurysm, the right was larger than normal.

The kidneys showed a moderately advanced grade of cirrhosis.

ACUTE APPENDICITIS WITH LOBAR PNEUMONIA.

BY ALAN PRYDE, M.B., B.S. (Melbourne),
Hamley Bridge, South Australia.

THERE are several interesting and unusual details in the following case.

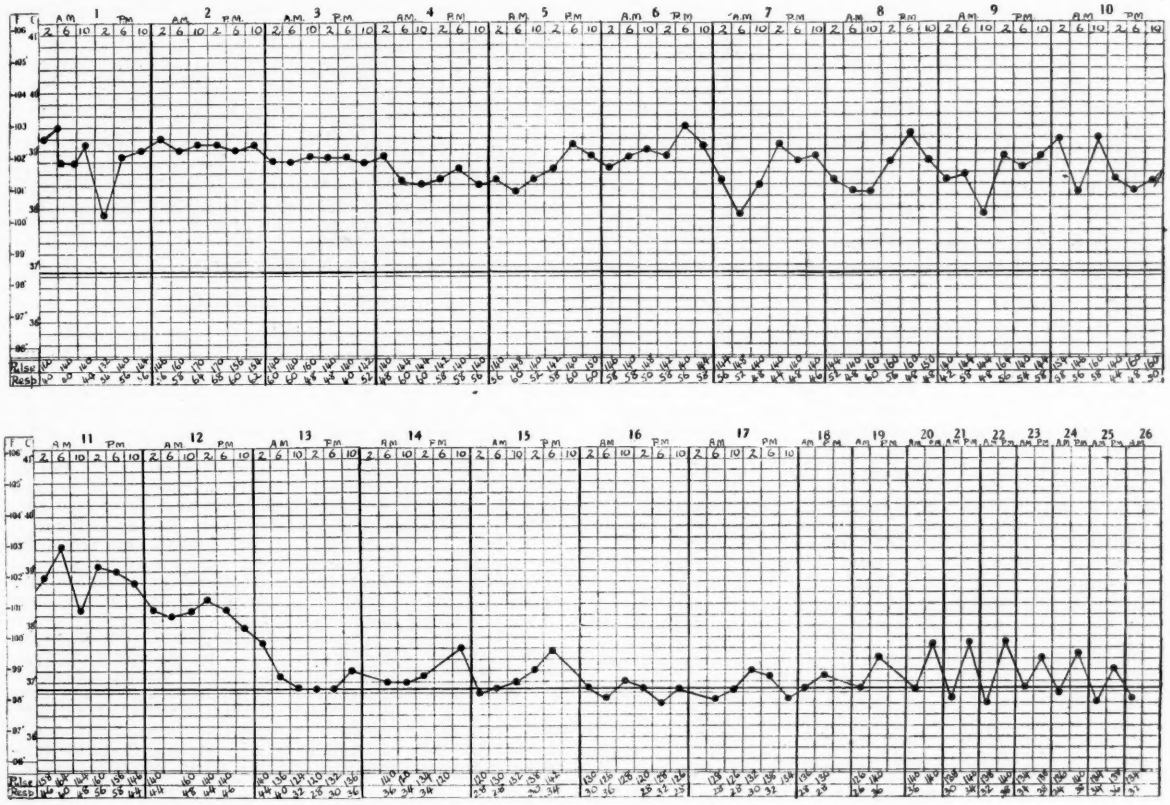
At 4 a.m. on November 28, 1922, I was called to see D.T., a boy aged three years and two months. For four days he had had a "cold" with cough. He had been up and about. On the previous evening he had become hot and his breathing rapid. On the morning of November 28, at about 1 o'clock he had complained of pain in his abdomen and had been crying on and off because of it. He had had previous attacks of mild "stomach ache."

His facial expression when examined was typical of a patient with pneumonia. His temperature was 39.4° C. (103° F.), his pulse-rate was 130 and his respirations 40 in the minute. Examination of the chest did not reveal any abnormal physical signs. The abdominal wall was rigid and there was tenderness extending over the whole belly. The tenderness was greatest over McBurney's point. The diagnosis of acute appendicitis as the urgent condition was made, while it was realized that a lobar pneumonia might also be present. Immediate operation was accordingly advised.

At 11 a.m. anæsthesia was induced with the "A.C.E." mixture, "Eau de Cologne" being substituted for the alcohol. The abdomen was opened through McBurney's incision. Serous fluid poured out through the opening in the peritoneum as soon as it was incised. An acutely inflamed, slippery appendix was found. There were some dense adhesions about the centre of the organ. It was removed and the abdomen closed in the usual way. Light anæsthesia with ether administered by the open method, was maintained during the latter part of the operation. The child took the anæsthetic well and his condition at the end of the operation was apparently as good as before.

Following the operation, the temperature, pulse and respiratory rates remained high and the chart appeared typical of that seen in connexion with lobar pneumonia. He took his nourishment well on the same day and on the days following the operation. In fact the operation did not seem to incommode him at all. He no longer cried with abdominal pain and he was comparatively easy. The short cough which had been present before the onset of the abdominal symptoms, continued to get worse.

On the third day signs of consolidation were detected in the upper lobe of the left lung and by the fifth day the whole upper lobe was affected. On the seventh day the temperature commenced to come down. The crisis was expected but did not occur. The pneumonic signs extended to the lower lobe of the left lung and were attended by irregular pyrexia. His general condition which had been good, then became bad; he became thin and fretful.



TEMPERATURE AND PULSE CHART OF DR. PRYDE'S CASE.

On the twelfth day the pleural cavity was punctured but no pus was found. On the thirteenth day a typical crisis occurred. The temperature fell to below normal and his general condition improved. During the following week he ate ravenously, rapidly lost the signs of illness and became convalescent. He was discharged from hospital on the twenty-sixth day. One month later he looked very well. His lungs were clear and the operation wound was a solid scar. Six months later he was perfectly well and had had no more "stomach aches."

The points of interest are: (*i.*) The occurrence of an acute appendicitis in a child of three years; (*ii.*) the presence of well developed adhesions in a child of this age; (*iii.*) the simultaneous onset of the pneumonia; (*iv.*) the fact that the anæsthesia was tolerated without untoward sign during the pneumonia; (*v.*) the appearance of the crisis on the thirteenth day, following what was probably an added ether pneumonia.

Reviews.

SOME CONCEPTIONS OF PUBLIC HEALTH.

DR. W. G. Aitchison Robertson, a teacher and examiner in so-called public health at the Surgeon's Hall Edinburgh, has perpetrated one of the gross offences of modern hurry. He has written a pocket book, known as "Aids" and dares to entitle it "Aids to Public Health."[1] In his preface he expresses the hope that his endeavour will be found useful in refreshing the memory of the student. He states that it contains the main facts in matters pertaining to public health and he hopes it may prove of assistance to those preparing for examination. Dr. Robertson is well known as an old-fashioned authority on sanitation and the mechanical subjects included in hygiene. But the student who would learn even this part of hygiene, would be ill-advised if he relied on this sketchy and often misleading dissertation. Abbreviations of all kinds are objectionable, but short cuts to knowledge are especially dangerous and to be avoided. The popularity of these potted "Aids" is no guarantee of their desirability. It merely indicates that the student is easily misled and readily accepts a short cut to his objective, the passing of an examination. The most iniquitous part of the book, however, is that dealing with the prevention of disease. The student could not obtain from its pages the impression that the supreme object of the medical profession is to eliminate preventible disease. The short chapter on the medical inspection of school children contains several

[1] "Aids to Public Health," by W. G. Aitchison Robertson, M.D., D.Sc., F.R.C.P.E. 1923. London: Baillière, Tindall & Cox; Foolscap 8vo., pp. 160. Price: 3s. 6d. net.

gratuitous statements in bald language that could not be justified. For example children are divided into six classes in regard to mental condition: bright, fair (sic), dull, backward, mentally defective and imbecile. If Dr. Robertson means intellectual development, when he uses the term mental condition, the classification would be crude and unacceptable. Where would he place the intellectually supernormal child with moral defect?

In the chapters dealing with infective diseases he fails signally to indicate the several means that have been suggested for combating infections. He perpetrates the baseless belief of the infectivity of the desquamated skin in scarlatina. In writing on plague he mentions *Pulex irritans*, bugs and lice as the common vectors of *Bacillus pestis*. It would be interesting to ascertain the evidence on which this is based. Altogether the book should be avoided by students who desire to learn something worth retaining.

SURGERY OF THE STOMACH AND DUODENUM.[1]

JAMES SHERREN has published in the form of a small book the lectures on the surgery of the stomach and duodenum, which he delivered to the students of the London Hospital.

In the first lecture the author discusses very fully the pathology of acute and chronic gastric ulcer. He brings forward much evidence taken from his own clinical observations to prove that the original cause of gastric or duodenal ulcer is generally some infective focus which can usually be discovered at operation. He finds that in his practice ulcer is most frequently associated with disease of the appendix or gall bladder. He would regard any operation for ulcer as incomplete unless special attention had been directed to the removal of these septic foci. In his experience an acute ulcer which has been sutured for perforation, is very likely to recur, unless the causative infection which is generally appendiceal, is subsequently removed. The hæmatemesis of acute ulcer may be often permanently cured in a similar way. This is sound common sense and is often neglected in practice and it cannot be emphasized too much. On the other hand, it should not be forgotten in the hunt for a septic focus that the question of depression of resistance, whether local or general, that is the variations in natural immunity, is all-important and is often as remediable as the infection.

He discusses in a very interesting way the difficulties that he has experienced in the diagnosis of different forms of dyspepsia. He says: "You may make a diagnosis of appendical dyspepsia, but never act on that diagnosis. When you operate, examine the whole abdomen, for any symptoms produced by chronic disease of the appendix may also be produced by chronic duodenal ulcer." With this we wish to agree. Appendiceal dyspepsia is not as common as surgical writers would have us believe. It is also very difficult to make a diagnosis that the appendix is the cause. There is quite a proportion of patients in whom a gastric or duodenal organic lesion is found and who have had an appendicectomy previously performed in the belief that chronic appendicitis was the cause of the dyspepsia. It is also noticed that many who suffer from dyspepsia of inorganic origin, have also had an appendicectomy without any benefit.

The author is a great believer in gastro-jejunostomy. He performs it for "small free ulcers on lesser curvature not adherent or unduly indurated." It is a common experience that what a surgeon may regard as a successful gastro-enterostomy a patient will often regard as a failure. The patient feels himself subject to vague and unpleasant symptoms which he finds very difficult to describe. Special methods of resecting these small ulcers with removal of any infected causative focus will leave an average normal stomach and will give no higher percentage of failures than will gastro-enterostomy, which is often unsuitable for an ulcer of lesser curvature. In addition to this, after resection the patient is not afflicted for the rest of his life with a gastro-enterostomy. We agree with Sherren that moderate or large resections must be combined with gastro-enterostomy and, like him, we prefer some form of partial gastrectomy except where the ulcer is very high up in the fundus of the stomach.

In the lecture on the management of that difficult problem—gastric hæmorrhage—the author relates his successes and failures in an interesting and instructive manner and he lays down guiding principles which students should take to heart.

That important subject—the early diagnosis of cancer of the stomach—receives special attention.

The lectures are most attractive, because they are so simple and are so clearly written. They express the modern views on this subject without being involved by historic processes and methods which are often copied from text book to text book for the sake of completeness. In addition the lecturer has made them so clinical and so practical by constantly quoting from his own rich personal experiences. It is quite a relief to read a book which deals so well with the diagnostic side of surgery and has such a human touch running through it.

Although the book is designed for and will be most valuable to students and is an example of the type of lecture that should be delivered to them by teachers, general practitioners and surgical clinical teachers will nevertheless derive benefit by its perusal.

[1] "Lectures on the Surgery of the Stomach and Duodenum," by James Sherren, C.B.E., F.R.C.S.; 1921. London: H. K. Lewis & Company, Limited; Crown 8vo., pp. 96. Price: 4s. 6d. net.

AIDS TO BACTERIOLOGY.

"AIDS to Bacteriology,"[1] by W. Partridge, now in its fourth edition is quite a good book of its kind; at the same time it is difficult to understand what class of student uses such books. Medical students should undoubtedly be recommended to study such books as Muir and Ritchie's "Bacteriology" and they should not need pocket books. Partridge follows the conventional plan of text books on bacteriology. He commences with general considerations of bacterial life and immunity; he proceeds to bacteriological methods, then he undertakes a systematic discussion on bacterial groups and races, he investigates moulds and protozoa and finally he devotes a considerable section to the bacteriology of foods, air and water and a discussion of disinfection. The author is not a medical graduate and therefore gets astray sometimes in his statements concerning diseases. For example, he states that influenza, diphtheria, pneumonia and erysipelas may predispose the patient to a second attack of the same disease. Again it is not correct to teach that the antibody formed through the introduction of an antigen consists of two bodies, namely complement and amboceptor and then to amplify this by stating that the complement is present normally in the serum of every animal, whether healthy or diseased. The explanation of the Bordet-Gengou phenomenon and Wassermann's test are neither very clear nor correct. The author recommends the sterilization of bacterial vaccines by heating for an hour or more in the presence of 0.5% solution of carbolic acid at a temperature of 56° C. to 60° C.. There is no need to use such a high temperature in the preparation of ordinary bacterial vaccines, as this strength of carbolic acid usually kills in twenty-four hours at 37° C.. The author in fact states that prolonged heating or the use of too high a temperature lowers the activity of the vaccine.

Finally, it is always possible to find errors of statement and faulty recommendations in these pocket books and it is unlikely that any one man, particularly if handicapped by the lack of a medical education, can give a clear and accurate abstract of bacteriology and immunity, particularly in relation to human infections.

[1] "Aids to Bacteriology," by William Partridge, F.I.C.; Fourth Edition; 1922. London: Baillière, Tindall & Cox; Foolscap 8vo., pp. 276. Price: 5s. net.

The Medical Journal of Australia

SATURDAY, JULY 14, 1923.

The Pan-Pacific Science Congress.

THREE years ago a gathering of scientists took place at Honolulu for the purpose of discussing some of the important scientific problems of the Pacific and of instituting an international organization whose object would be the promotion of the study of scientific problems of common interest to all countries within and bordering the Pacific Ocean. The meeting resolved to call itself the first session of the Pan-Pacific Science Congress. It was then determined that the second session should be held in Australia in 1923. The task of carrying out the arrangements of this session of the Pan-Pacific Congress has been entrusted to the Australian National Research Council. It has been decided that the session will be divided into two parts. There will be meetings in Melbourne from August 13 to 22, 1923, and more meetings in Sydney from August 23 to September 3, 1923. It is not our intention to discuss in this place and at this time the wisdom or otherwise of this dual arrangement. It may be anticipated that scientists attending the session will derive increased benefit by having two settings and two environments for the meeting. It has been pointed out that the knowledge possessed at the present time of the Pacific is very limited. There are many unsolved mysteries, many anomalies to be explained, many hygienic problems to attack and to be met. Australia has a great vested interest in the mighty ocean that washes its eastern shores and she is deeply concerned with the problems of the other countries and nations represented within and around this vast, fascinating sea. The scientists who met at Honolulu in 1920, recognized the extent and scope of the tasks awaiting their application. They saw at a glance that the ocean itself, the islands and the continents needed special treatment and that information concerning zoological, botanical and geological matters collected in the older parts of the world could not be applied without modification in these parts. At this second session the sciences concerning the earth and the sea, plant life, animal life, bird life, insect life, fish life and dead matter will find discussion, but the most prominent subject will be man and his environment. To the seeker after truth the mechanism of the workings of Nature must always form an attractive, half closed book, into whose pages he desires to peer. It may appear to some that the anthropologist and ethnologist, the man concerned with the physical problems of the earth and with its strange, rhythmical movements, the zoologist and the geologist are all dealing with matters of academic interest rather than of practical importance. The discussions that will take place in Melbourne and Sydney shortly, will correct this erroneous view. But it must be admitted that for the medical profession the chief attraction of this congress will lie in the Section of Hygiene. At a later date we hope to publish the programme of this section. The subjects will embrace the hygiene of mines, many matters associated with hygiene of the tropics and certain sociological questions which affect Australians as well as the native races of the islands and the nations of other Pacific lands. Many eminent scientists from other countries have been invited to attend the meetings and many have accepted the invitation. From Great Britain Professor C. J. Martin, F.R.S., will be the sole representative of hygiene, while Professor W. J. Perry will interest himself in ethnology and anthropology. New Zealand and Canada will have several representatives and Papua and Hongkong will have one each. From foreign countries there will be scientists from the United States of America, from the Netherlands and Dutch East Indies, from Japan and Formosa and from colonies of America and other countries. It is imperative that there should be a good membership of Australian scientists and more particularly of Australian hygienists whose chief concern will be the prosecution of the study of those chapters of hygiene in its widest sense that are peculiar to the Pacific countries and islands. It is hoped that the medical profession will take this matter seriously and evince interest in this meeting. Hygiene is too often left to the care of the adminis-

trative officers of the Governmental departments. All our medical schools have bio-chemists and biophysicists, medical zoologists and biologists, bacteriologists, protozoologists, pathologists, clinicians and hygienists whose life work is the elucidation of the very matters which concern this congress. The same sciences are reflected in the practising medical profession. In modern times, with preventive medicine gradually overshadowing curative medicine, the study of Nature's methods of preserving health is claiming the attention of an increasing number of medical practitioners. In these circumstances it would seem to be unnecessary to elaborate an argument in favour of a large medical attendance, just as it is superfluous to dwell on the supreme importance of special investigations into the causes of the preventible diseases of our own country. We commend the Pan-Pacific Science Congress to the best consideration of our readers.

THE HOBART HOSPITAL FARCE.

FOR some considerable time the Council of the Tasmanian Branch of the British Medical Association have been conducting negotiations with the Government of Tasmania and with the Board of Management of the Hobart General Hospital with a view to the settlement of the difficulties which have existed for many years. It is unnecessary to recall the events that led to the open feud between the mass of the medical profession in Tasmania and the Government. When the Government refused to recognize the fundamental principle that public hospitals to which the members of the visiting staff gave gratuitous services, were charitable institutions for the treatment of the sick poor, a strong protest was raised by the Tasmanian Branch against a measure that was introduced into Parliament. The announcement by the Government that the hospitals were open to anyone caring to seek admission, irrespective of his means, was a signal for the resignation of the members of the staff in a body. The Government appointed a practitioner who did not enjoy the confidence or recognition of the members of the medical profession because his registration had been effected in virtue of a certificate or diploma of what seemed to be a bogus American night college. The investigations into the charges made at that time of irregularity of admission to the medical register were neither unbiassed nor fair. In the end Parliament adopted the extraordinary expedient of passing a special measure to legalize the registration of this practitioner. A contract was made with this man to act as the Surgeon Superintendent of the Hobart General Hospital at a relatively high salary for a definite period. Just before the expiration of this period the contract was renewed and as the question of his right to engage in consulting practice was raised, the second contract specifically provided for this privilege. Years passed during which the Surgeon Superintendent naturally gained in manual dexterity and technical skill, although it can scarcely be expected that this skill was associated with an adequate knowledge of physiological and pathological processes. Be this as it may, the Council of the Tasmanian Branch realized that a continuation of the exclusion of the leading members of the profession of Tasmania from the hospital staff was acting to the detriment of the public. An endeavour was made to compromise with the Government. The offer was made that under certain safeguards members of the medical profession would again act in an honorary capacity in the hospital. These safeguards and the special conditions under which the compromise was offered, were subject of protracted discussion. On May 22 of this year a conference was held at the request of the Chief Secretary at which three members of the Hobart Hospital Board of Management and four members of the Tasmanian Branch of the British Medical Association attended. Views were freely exchanged and it was agreed that each side should submit to the Chief Secretary written suggestions in regard to the appointment of members of the honorary and paid medical staffs. It was understood that after the Chief Secretary had perused these statements, a second conference would be held at which the Chief Secretary would act as adjudicator. Mr. P. S. Seager undertook to call a meeting of the Board of Management in order that a statement might be drafted for submission to the Chief Secretary. Dr. Gregory Sprott undertook to call a meeting of the Branch for the same purpose. It appears that Mr. Seager did not carry out his promise, but that

he submitted to the Chief Secretary a document containing information the nature of which has not been disclsoed. A meeting of the Tasmanian Branch of the British Medical Association was held on May 26, 1923, and it was resolved that the following conditions would be accepted by the Branch. In the first place the visiting staff should be a complete honorary staff of four surgeons and four physicians with assistant surgeons and physicians and specialists for the several departments. In the second place the salaried members of the resident staff should devote the whole of their time to the work of the hospital. In the third place no member of the visiting staff should be paid, with the possible exception of the pathologist or the radiologist. Lastly all appointments should be advertised and the conditions of appointment should be set out in the advertisement. These suggestions were submitted to the Chief Secretary on May 28, 1923. On May 25, 1923, that is on the day before the meeting of the Branch and only three days after the conference the Board of Management of the Hobart General Hospital met and re-appointed Victor Richard Ratten, Dr. Crowther and Dr. Macgowan to the positions they had previously held. The Surgeon Superintendent (Victor Richard Ratten) is to be allowed the right to see private patients for an average of two hours daily, provided that the work of the hospital be regarded as of first importance. This action on the part of the Hospital Board of Management closes the door to further negotiations. The entire want of sincerity of the members of the Board and their obvious opposition to a restoration of the honorary system of staffing renders nugatory all the attempts at compromise on the part of the Tasmanian Branch of the British Medical Association and the seeming inclination on the part of the Chief Secretary to intervene as peace maker. The Board of Management has done the public as well as the medical profession a grave injury. Unless the Chief Secretary refuses to endorse this action of the Board, it is unlikely that the medical profession will at any future time lend its aid to this institution or be prepared to accept a compromise. We warn members of the medical profession througout Australia not to apply for or accept appointment in any capacity at this hospital.

Current Comment.

THE PERMEABILITY OF THE INTESTINAL MUCOSA TO BACTERIA.

SINCE Klenke in 1846 showed that it was possible for infection to take place through the walls of the digestive tract, the question of the passage of bacteria of various kinds through the intestinal mucosa has been the subject of much investigation. That tuberculous infection may take place in this manner has been acknowledged since Chauveau reported the results of his investigations in 1868. It may be supposed that infection through the intestinal mucosa may take place in one of three ways. The bacteria in question may gain access to the blood stream, they may travel by way of the lymphatic channels or they may attack directly the tissues. Many observations have been made in this connexion in regard to the tubercle bacillus. Bisanti and Panisset fed dogs on soup containing tubercle bacilli and within four to five hours demonstrated the presence of bacilli in the heart's blood. Tubercle bacilli were likewise found in the chyle by Nicholas and Fescos three and three and a half hours after ingestion in milk. Porcher and Desoubry found that even in normal conditions considerable numbers of bacilli passed into the chyle during digestion. These observations support the commonly held conception that bacilli may enter the body by way of the intestinal canal without the production of a primary focus of infection at the site of entry. Much more work has been done on similar lines.

The question of the permeability of the intestinal canal to bacteria and their presence in the lymphatic channels has recently been investigated by Drs. C. S. Williamson and R. O. Brown.[1] These observers investigated the question from the point of view of the production of post-operative pneumonia. They tried to discover whether bacteria introduced into the intestinal canal under normal conditions could be recovered from the lymph stream. Dogs were used for the experiments. By means of a carefully planned operation a permanent fistula was made between the thoracic duct and the exterior. The external jugular vein was divided and brought to the surface in the neck. The subclavian vein and all collateral vessels were ligated in such a manner that the thoracic duct opened on to the surface through the external jugular vein. A catheter was retained in the opening for a few days. The fistula usually remained patent for about two weeks. The organism chosen for the experiments was *Bacillus prodigiosus*. This organism was chosen as being easily cultivated, not commonly found in the laboratory, non-pathogenic and readily identifiable. Cultures were made from the fistulous opening at varying intervals up to forty-eight hours after ingestion of the organisms. Eight groups of experiments were carried out. Bacteria were administered to fasting dogs, to dogs after the ingestion of castor oil or magnesium sulphate twelve or fifteen hours previously, to dogs fed on different types of diet, to

[1] *The American Journal of the Medical Sciences*, April, 1923.

dogs by injection directly into the jejunum, to dogs after trauma of the intestinal canal at operation, to dogs after the performance of gastro-enterostomy or end-to-end anastomosis, to dogs by the rectum and by means of a bacterial suspension directly into the peritoneal cavity. The *Bacillus prodigiosus* was not recovered in culture except in two instances. Drs. Williamson and Brown state that the injections made directly into the jejunum were undertaken in order to determine, as was thought possible, whether or not the bacteria taken by the mouth were killed by the action of the gastric juice. It was thought desirable to obviate this possibility. The bacteria were introduced near the beginning of the jejunum, as this, in addition to lessening the concentration of hydrochloric acid, would provide for maximal absorption. After the trauma had been inflicted on the bowel of the dogs by open operation and bacteria had been injected directly into the lumen, the bacilli were recovered in cultures made from two animals. Both these dogs, however, had vomited and the bacteria were regarded as contaminations from the vomitus. In four out of eight animals injected intraperitoneally a growth was obtained. No cultures of *Bacillus prodigiosus* were obtained from the fæces of any animal. Drs. Williamson and Brown state that it is possible that the bacilli were destroyed by the bactericidal action of the digestive juices. They also suggest that possibly the bacteria were absorbed by the intestinal villi and entered the blood stream. No examination of the blood with the object of settling this point was made. Although this may possibly be a phenomenon of autolysis, it is not unlikely that it may be associated with the phenomenon described by D'Herelle as bacteriophagia.

In considering the experiments made by these observers it must be remembered that all such experiments are made under conditions which do not exist in the body. Moreover the *Bacillus prodigiosus* cannot be regarded as particularly stable and suitable for this purpose, though many workers have used it in similar experiments. Drs. Williamson and Brown state that if bacteria came through the fistula, they were not present in sufficient numbers to cause pneumonia. In this connexion it is interesting to recall the views of Weleminsky who held that tubercle bacilli were frequently carried from the intestine to the bronchial glands. He held that these glands were not merely concerned with the drainage of lymph from the thoracic viscera, but that they acted as terminal reservoirs for the lymph of the whole body and poured it by a special trunk, the *truncus broncho-mediastinus*, into the left subclavian vein. It is true that this view was not generally acepted.

Drs. Williamson and Brown do not discuss the finding of bacilli in the case of dogs in whom the injections were made intraperitoneally. They promise a further communication in this regard. Taking the work as a whole it would not appear that anything definite has been added to knowledge on the subject. Until much more has been done, it seems that the work of many on the tubercle bacilli in regard to lymphatic infection through the intestinal wall and the well-known clinical characters of the lymphatic involvement in the mesentery must still be accepted as true.

THE ARTERIAL SYSTEM AND DIETS RICH IN PROTEIN.

THE term arterio-sclerosis has been somewhat loosely applied to lesions affecting the walls of the arteries regardless of the particular layer of the arterial wall affected. Any of the three layers of the arterial wall may be the seat of disease. Sclerotic lesions of the *tunica intima* and *tunica media* are most commonly confused. When the *tunica intima* is the seat of degenerative change, the term atheroma or *endarteritis obliterans* should strictly be applied to the condition. On the other hand when the lesion is situated in the walls of the smaller vessels it is of a more diffuse variety. This diffuse form of arterio-sclerosis was named by Gull and Sutton arterio-capillary fibrosis. The changes in the vessel walls are primarily situated in the *tunica media*. This diffuse arterio-capillary fibrosis is often associated with atheroma of the aorta which is held by many to be due to changes in the *vasa vasorum*.

There are many factors which enter into the causation of arterial disease. Alcohol, syphilis, occupation and conditions of diet are those most usually in operation. Much experimental work has been carried out on animals in regard to the pathogenesis of arterial disease. Thus in 1903 Josué reported the production of arterial lesions in rabbits as a result of the intravenous injections of extracts of suprarenal body. Many observers have undertaken similar work and the majority have concluded that the lesion produced was due to a primary change in the unstriped muscle of the *tunica media*. Other workers produced arterial lesions by the injection of bacteria into the veins of animals. Klotz in 1906 published the results of his experiments in this connexion. The lesions produced by him were mainly found in the *tunica media* and were thus of the true atheromatous type. Feeding animals with abnormal diets has been the method of experimentation of many. Workers along these lines have included Ignatowsky, Stuckey, Saltikow and Steinbiss. All these observers were able to produce arterial lesions by feeding diets rich in proteins to various animals. In 1900 Newburgh and Squier reported the results of some experiments in which they succeeded in producing arterial lesions in rabbits by feeding with diets rich in protein. In discussing these results at that time they announced that there were two possible sources of error in assuming that there was causal relationship between the lesion and the diet. In the first place arterio-sclerosis might be a lesion of frequent occurrence in normal rabbits and in the second place arterio-sclerosis might be common in old rabbits. They quoted figures from other workers in regard to the first possibility and investigated the aortas of numerous normal rabbits to show that

arterial lesions were not commonly found in rabbits. They avoided the second possibility by using only young rabbits for their experiments.

These two possible sources of error have been guarded against in another series of experiments which Dr. H. Newburgh has published in conjunction with Dr. Sarah Clarkson.[1] In this study Drs. Newburgh and Clarkson lay great stress on the importance of differentiating between lesions of the *tunica intima* and of the *tunica media*. Their investigations dealt exclusively with the condition analogous to what they term human "atherosclerosis" and define as a primary lesion of the *tunica intima* exclusive of intimal lesions secondary to medial changes and changes in the *vasa vasorum*. In their experiments they used two diets. The first diet was prepared from one thousand grammes of powdered beef, two thousand grammes of flour bran mixture, twenty grammes of sodium chloride and fifty grammes of baking powder. The second diet was similar except that it contained only five hundred grammes of powdered beef. The first diet thus contained 36% of protein and the second 27%. Twenty-four rabbits were fed on the first diet and lived for periods varying from four to thirty-six weeks. Fifty-one rabbits were fed on the second diet. Forty of these lived for less than twenty-six weeks and eleven lived for periods of twenty-six up to fifty-nine weeks. All the rabbits fed on the first diet gave evidence of definite and extensive atherosclerosis. Of those fed on the second diet only the eleven who lived over twenty-six weeks, presented any evidence of athero-sclerosis. The lesion as seen by the naked eye was found to be made up of discrete and confluent, raised, opaque white streaks and plaques. These were always more noticeable in the upper part of the aorta. When examined microscopically the lesions were found to be due to a primary disease of the *tunica intima*. The initial injury was a necrosis or fatty degeneration of the endothelial cells. The intima then became thickened by large cells loaded with fat and imbedded in a hyperplastic tissue. Later it appeared that a layer of elastic tsisue was laid down on the lumen side of the vessel and that the layers of the fatty degeneration and necrosis invaded the *tunica media* for a varying extent. In four animals there were found lesions that were regarded as being without doubt primarily medial in origin. For the purposes of control many normal animals were examined and also many animals who lived under laboratory conditions on normal diets.

Unfortunately no examinations have been recorded by Drs. Newburgh and Clarkson on the peripheral vessels and the vessels of the kidneys. Dr. L. M. Polvogt, Dr. E. V. McCollum and Dr. Nina Simmonds have recently investigated the question of the production of lesions in the kidneys by feeding rats on diets which were normal except that they contained excess of protein.[2] They point out that it is not justifiable to make deductions concerning the effects of a specific factor, such as protein, in a feeding experiment in which several other components of the diet are obviously very deficient either in amount or quantity. The observations of Drs. Polvogt, McCollum and Simmonds was concerned only with the kidneys of the rats and are not immediately concerned in the present discussion. Their observation in regard to the question of diet is, however, most pertinent.

Although the observations of Drs. Newburgh and Clarkson are largely confirmatory of much previous work, it would be profitable to have their observations made on animals eating a normal diet with the addition of protein.

[1] *Archives of Internal Medicine*, May 15, 1923.
[2] *Bulletin of the Johns Hopkins Hospital*, May, 1923.

DEATH BY ELECTROCUTION.

A RECENT fatality from electric shock at Lithgow and another in Western Australia call attention to the subject of death from electric currents. Death may be caused either by paralysis of the respiratory centre while the heart remains beating or overthrow of the heart's action by the sudden development of ventricular fibrillation. In the second type it is doubtful whether the normal heart's action is ever re-established, but in both instances artificial respiration should be persisted in. The concensus of opinion seems to be that higher voltages cause respiratory failure and that lower voltages cause ventricular fibrillation. This view is strengthened by the fact that a higher percentage of recoveries is reported after use of artificial respiration on those shocked by currents of high than by currents of low voltage. Low pressure currents of the alternating type are the most dangerous.

There were two hundred and seventeen deaths from electric shock in Great Britain during the period 1912 to 1921. One hundred and fifty of these were due to currents of under two hundred and fifty volts and all but six were due to alternating currents. Of the six deaths due to direct current only one was really due to electricity. The remainder were due to extensive burns. Thirty-nine deaths were caused by alternating currents of medium pressure—currents of between two hundred and fifty and six hundred and fifty volts. Seventeen deaths were caused by currents whose voltage varied between six hundred and fifty and three thousand. Thirty-one deaths were caused by currents of voltages over three thousand.

Victims of alternating currents cannot move when shocked, because the muscles in the path of the current have become rigidly contracted. They may retain consciousness.

In the prevention of accidents insulation is of the utmost importance. Hand lamps and wire-guards are frequently faulty in this regard. Wire guards should be insulated from lamp holders, especially as they are generally used on conducting floors. Porcelain insulated switches should always be installed in damp places and where concrete, "Ironite" or tiled floors are in use. The only treatment of any avail in shock by electric currents is artificial respiration.

Abstracts from Current Medical Literature.

THERAPEUTICS.

Action of Camphor, Menthol and Thymol on the Circulation.

REGINALD ST. A. HEATHCOTE (*The Journal of Pharmacology and Experimental Therapeutics*, April, 1923) maintains that camphor, menthol and thymol depress the isolated heart of both frogs and rabbits by direct action on the cardiac muscle. All three dilate the coronary vessels. In anæsthetized animals camphor, however administered, does not cause a rise of blood pressure, provided the dose is not sufficiently large to produce convulsions. Similarly, after the cerebral hemispheres are excised, no rise of blood pressure results even when the dose administered is as much as 1.0 gramme per kilogram of body weight. He asserts as the result of experiments that there is no convincing pharmacological evidence that camphor possesses any value as a cardiac or circulatory stimulant. Its value, if any, for this purpose in man should be established or disproved by more exact clinical observations. In all instances, whether camphor, thymol or menthol was administered, it was found that adrenalin would cause its usual large rise of blood pressure when these drugs had been administered and had lowered the blood pressure considerably.

Respiratory Palsy Due to Quinidine.

WILLIAM D. REID (*The Journal of the American Medical Association*, December 9, 1922) has reported an instance of respiratory paralysis following treatment with quinidine. The majority of fatalities following the administration of quinidine have been attributed to embolism and more rarely to heart block. Four instances of respiratory paralysis have hitherto been published, in all of which recovery occurred. The author administered 2.8 grammes of quinidine sulphate over a period of three days to a patient suffering from auricular fibrillation. In the early morning of the fourth day the patient collapsed, hiccough set in, the breathing became very slow and cyanosis appeared. The breathing then ceased entirely for two or three minutes. Four similar attacks occurred within eight hours, the final cessation of respiration lasting fifteen minutes. The patient recovered from these untoward symptoms, but her cardiac condition was not materially improved. Von Frey has pointed out that such symptoms may not necessarily be peculiar to quinidine, but appear to result from the use of quinine, to which some persons have an idiosyncrasy.

Iodine in Pulmonary Tuberculosis.

FERNAND LÉVY (*La Vie Médicale*, May 26, 1922) has drawn attention to the excellent therapeutic action of large doses of tincture of iodine on pulmonary tuberculosis. Bondreau, who introduced this form of treatment, recommends the administration of as much as six hundred drops daily, equivalent to one gramme of metallic iodine, in spite of the warning issued in the French Codex, that the maximum daily dose is one-tenth of that amount. The tincture does not provoke those symptoms of intolerance which result from even weak doses of iodides. Nevertheless, it is exceedingly disagreeable to the taste. To overcome this disability Henri Bernard uses a mixtures containing one part of the tincture and two parts of glycerine. If this preparation is administered in a little cold milk, the disagreeable taste is admirably masked. The author found that therapy with this glycerinated tincture led to rapid general improvement in tuberculous patients. The appetite returned, the body weight increased by one kilogram a week, night sweats disappeared and cough and expectoration diminished.

Hexamethylenetetramine as a Diuretic.

H. O. RUH AND P. J. HANZLIK (*The Journal of the American Medical Association*, December 9, 1922) have denied the assertions of Nicolaier, Lilienthal, Impens and Seifert and Müller that hexamethylenetetramine acts as a diuretic. In this denial they support the view of Thompson and Strauss and Seibert, who have for many years attacked the popular belief that the drug produces diuresis. The influence of hexamethylenetetramine in small doses (one gramme) and in larger doses (5.2 grammes) on the urinary output was studied in three convalescent boys under controlled conditions. The output of urine was in each instance uninfluenced. The duration of excretion in the urine ranged from twenty to twenty-four hours, being somewhat longer with the larger doses used, but independent of fluid intake and diuresis. The total excretion of hexamethylenetetramine was variable and ranged from 32% to 82% and was also independent of dosage, fluid intake and diuresis.

Epinephrine.

C. M. GRUBER (*The Journal of Pharmacology and Experimental Therapeutics*, December, 1922) records the results of experiments to determine the effect produced by solutions of epinephrine on the digestive tract of frogs. Frogs' intestines were excised and placed in Ringer's solution on a clean glass slide. The strips were attached to a recording apparatus. Solutions of one in 1,000,000,000 up to one in 1,000 were applied to the strips of intestine and the results noted. It was found that weak solutions (one in 100,000 or less strong) caused tonic contractions of both longitudinal and circular muscular coats of the œsophagus, stomach, small intestine, rectum and cloaca. Strong solutions (one in 20,000 to one in 1,000) caused relaxation of the muscular coats. Similar effects were produced on the cardiac and pyloric sphincters by adrenalin. The lower part of the digestive tract was more sensitive to the action of adrenalin than the œsophagus. The author considers that the action of adrenalin in these experiments was on the sympathetic nerves, with the production of tonic contractions. Another theory, that the difference in action to adrenalin was due to a difference in metabolism, did not seem a sufficient explanation. It was noted that the ileo-colic sphincter responded to all concentrations of adrenalin by tonic contractions. Adrenalin chloride and epinephrine were used at first, but as their actions appeared identical epinephrine only was used for the later tests.

Tobacco Smoke.

J. P. BAUMBERGER (*The Journal of Pharmacology and Experimental Therapeutics*, February, 1923) publishes the results of his investigations into the carbon monoxide content of tobacco smoke and its absorption on inhalation. Smoke was drawn through an apparatus designed to estimate the carbon monoxide content. Smoke from "Piedmont" cigarettes was found to have a carbon monoxide content of 0.19% to 0.31% and a cigar yielded twice as much. The smoke from the burning point yielded only 0.05% carbon monoxide, that is nine times less than smoke which has been drawn through the cigarette or cigar. It was found that some carbon monoxide was retained after inhaling tobacco smoke and the author thinks that this probably united with the hæmoglobin of the blood in the lungs. The amount retained would usually not be sufficient to produce dangerous symptoms unless a person inhaled very frequently, say five times a minute, for an hour or more. In such circumstances a saturation of 22% carbon monoxide in the blood might possibly be reached. The author calculated that ten persons smoking in a room three metres long, three metres high and three metres broad with no diffusion would produce 2.1 parts carbon monoxide per 10,000 of air. The author considers that this should have no appreciable effect on a non-smoker. He concludes that it is extremely unlikely that the carbon monoxide of tobacco smoke is injurious to any but the most inveterate inhalers.

Morphine.

C. D. LEAKE (*The Journal of Pharmacology and Experimental Therapeutics*, December, 1922) has investigated the action of morphine on the vomiting centre of the dog. Ten milligrammes of morphine per kilogram of body weight were injected into six dogs. All vomited within twelve minutes. Injections of emetine and apomorphine of more than effective emetic strength were given and found not to produce vomiting when administered two or more hours after the morphine. When given fifteen minutes after the morphine both emetine and apomorphine caused vomiting. This action of morphine as an antemetic is not due to fatigue of the vomiting centre, but may be explained as being due to deficient oxidation owing to the action of morphine upon the vital centres.

UROLOGY.

Solutions for Use in Pyelography.

O. S. LOWSLEY AND H. R. MULLER (*The Journal of Urology*, January, 1923) have conducted experiments with the solutions of a large number of chemicals in order to determine their relative values in pyelography. Kidneys removed from animals just slaughtered were filled with solution, the ureter was clamped and a skiagram taken. As deep a shadow was cast by a 30% solution of ammonium bromide and a 20% solution of sodium iodide as by bismuth subnitrate in suspension. Potassium iodide gives the best shadow of all. It is, howeer, liable to produce toxic symptoms and should therefore not be used in pyelography. Sodium iodide is most suitable, for not only is it less irritating to mucous membranes but a 13.5% solution is as opaque as a 25% solution of sodium bromide. Moreover sodium iodide solution is much less viscous than the sodium bromide solution and therefore flows better. It is also much less hypertonic in relation to urine and consequently less injurious to the mucous membrane of the urinary tract.

Urinary Incontinence in the Female.

E. L. YOUNG (*The Journal of the American Medical Association*, November 28, 1922) emphasizes the fact that in the operative cure of incontinence in the female due to a relaxed bladder outlet it is necessary to expose and suture the sphincter muscle of the urethra. He also states that, in addition to this, it is necessary to suture the vesical sphincter itself in certain more severe conditions. The first and less common type occurs in young women and has its inception at a period of one week to several months after childbirth. The trauma of labour is the cause, but the evidence of such injury may only be slight or moderate. The second and far more common type is essentially a disturbance of later years. It is preceded by the trauma of labour and is due to a stretching and giving way of the musculature at and near the bladder neck. At operation a median incision is made along the anterior wall of the bladder from just below the urethral opening to a point immediately above the cervix. The mushroom head of a de Pezzer catheter placed in the bladder will indicate the neck of the latter viscus. The flaps of vaginal mucosa are undercut until the sphincters of the bladder and urethra are found. They are then brought together over the de Pezzer catheter with mattress sutures. In the first type suture of the urethral sphincter alone will suffice.

Double Renal Pelvis and Ureter.

W. F. BRAASCH AND A. J. SCHOLL (*Journal of Urology*, December, 1922) point out that anomalies in the urinary tract are of no clinical or surgical importance unless some pathological complication occurs in their presence. Bilateral duplication of the ureters occurs in only 6% of anomalies. With double ureter the pelvis is always duplicated. In addition, the kidney is actually double in its internal anatomy, though its external conformation may give no sign that such is the case. Should an external demarcation appear, it is usually found that the upper segment is smaller than the lower. This may actually be demonstrated in life by pyelography. If the duplication of the ureter is complete it can generally be discovered by observing two ureteric orifices on one side during cystoscopy. The ureteric opening, which is placed in a more caudal position in the bladder, is almost invariably the supernumerary duct. In rare instances it may open into the male posterior urethra, the female urethra, the vestibule or the vagina. In these circumstances there may be a suggestion of the presence of incontinence in association with the power of normal micturition. The most common complication of double ureter is hydronephrosis. This is due to ureteric obstruction as a rule in the region of the junction of the two ureters when there is complete duplication. In a series of one hundred and forty-four patients showing the anomalies under discussion, only 42% had a pathological complication. The anomaly in these patients was discovered during routine urological examination.

Stricture of the Lower End of the Male Ureter.

R. H. HERBST AND A. THOMPSON (*The Journal of Urology*, February, 1923) draw attention to the comparative frequency with which stricture of the lower end of the male ureter is caused by direct extension from diseased seminal vesicles and prostate. The possibility of spread of infection from neighbouring parts to the ureteral wall has been realized for some time in appendicitis; it is equally possible from infected internal genital organs in the male. Obstructions of this type are often unrecognized since the symptoms are usually overshadowed by those from the genital organs. It is only after relief has been obtained from the inflammation of the vesicles and not from the pain and the pyuria that a lesion of the ureter or kidney pelvis is suspected. Such strictures are usually found in early or middle adult life. Clinically and pathologically three types or stages of the disease may be recognized. The first is characterized by congestion in which there is swelling of the ureteric mucosa associated with acute prostatitis and acute vesiculitis. The second is the inflammatory type. In this there is an infiltration of the ureteric wall which may persist as such for some time before progressing to connective tissue proliferation. The third stage is characterized by fibrous stricture. It follows the inflammatory type and is largely due to irritation by the urinary chlorides. The chief symptoms are pain which may remain low or radiate to the flank, hæmaturia and pyuria. As observed with the cystoscope the peristaltic wave may be poorly transferred only to the ureteric orifice on the diseased or more diseased side. A uretero-pyelogram will reveal the degree of any ureteral or pelvic dilatation above the stricture. Treatment should be directed to the diseased genital organs. In addition the ureteric stricture may require dilatation, internal ureterotomy or even excision.

Nepholithotomy and Pyelolithotomy.

A. POUSSON (*Journal d'Urologie Médicale et Chirurgicale*, November, 1922) compares the indications of approach to renal calculi by an incision either through the kidney substance or through the pelvis of the ureter. There should be no more danger from hæmorrhage after nephrolithotomy provided the deeper line of catgut sutures is placed nearer the edge of the renal sinus than the convex border. A tube of the de Pezzer type should be placed in the pelvis and should leave the kidney at the middle of the incision in this organ. The tube is left in four to eight days. After nephrolithotomy clots are apt to block the outlet of the pelvis and urine consequently tends to infiltrate between the cut surfaces of the kidney. The de Pezzer tube leads the urine away and so the cut renal surfaces are left undisturbed and allowed to heal. After pyelolithotomy it is better to leave the incised pelvis unsutured. By this means any urine which is prevented from descending the ureter by reason of clots lying at the pelvic outlet, escapes easily from the pelvis and is carried to the exterior by the drain in the kidney wound. This drainage tube should pass down to the neighbourhood of the pelvis. Urine may escape from the wound for several days to a fortnight, but a fistula does not persist. The employment of either the pelvic or the renal incision depends on the shape, size and disposition of the calculi. Large ramifying stones, or small calculi lying in the minor divisions of the calyces are best removed by renal incision. Non-ramifying or only slightly ramifying stones lying in the pelvis and major calyces and small separate stones in the major calyces should be removed by pyelolithotomy. Occasionally the pelvic incision may be extended on to the kidney as in the "enlarged pyelotomy" operation of Marion. Should the large retropelvic artery be in the way, it may be ligated and divided.

Irritable Bladder.

W. W. DUKE (*New York Medical Journal*, November 1, 1922) discusses hyper-sensitiveness to certain foods as a not infrequent cause of pain over the bladder or of frequency of micturition, when these symptoms are associated with insignificant local lesions. The bladder symptoms occur as a part of a general reaction to some foreign substance and so may be accompanied by evidences of angio-neurotic œdema. Bladder symptoms only rarely accompany a sensitive reaction to air-carried substances, such as pollens and horsehair, probably because in these instances insufficient foreign material is absorbed to cause a definite general reaction. In order to discover the food or foods at fault the free use of intracutaneous tests is advised.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Royal Prince Alfred Hospital on June 8, 1923, Dr. C. H. E. Lawes, the President, in the Chair.

A Tumour of the Spinal Cord.

PROFESSOR A. E. MILLS presented a patient, aged sixty-seven years, who had been admitted on May 2, 1923, complaining of incontinence of urine for three months. He had not been quite well for two years. He had first noticed that his legs were getting weak, especially the right leg. At night he had severe cramps in his thighs and legs. These cramps had lasted for a few minutes and had then disappeared. The weakness of the legs had progressed and he had been compelled to give up his work a year previously. He had not had continuous pain in his legs. His urinary trouble had started three months before admission when he had noticed that he had wetted his bed at night. During the day he had been forced to rush to the urinal every hour as soon as the desire came. He had been unable to hold his water. When first seen he had passed urine without knowledge of the fact and after slight exertion. He had had piles for three months. Shortly before admission he had been unable to control his motions after he had taken medicine. There had been no loss of sexual power. He had lost 9.5 kilograms in weight. On admission the patient had been found to be a thin and poorly nourished man. He had much pyorrhœa. His tongue had been dirty. Examination by the rectum had disclosed that the prostate was not enlarged. The sphincter had been very lax. The anal mucous membrane had been prolapsed. His pupils had been equal, small and irregular. They had contracted to light, but not to accommodation. No signs of implication of other cranial nerves had been noted. There had been flaccid paralysis and wasting of the *tibialis anticus*, the *extensor hallucis longus*, the *extensor digitorum communis*, the *soleus*, the *gastrocnemius*, the *flexor digitorum longus* and the intrinsic muscles of the foot on the right side. Some power had still remained in the *peronei*. Those signs indicated that the lumbar and sacral segments were affected. There had been no paralysis of the muscles of the left leg, but wasting had commenced. The coordination had been good. The *glutei* and the external rotators of both thighs had been atrophied. The patient had been able to walk with the aid of a stick. He had dragged the toes of his right foot. There had been some disturbance of pain and touch and of temperature sensation on both sides in the areas of skin supplied by the fourth and fifth lumbar and the first, second and third sacral segments. The knee jerks had been very weak on the right side. On the left side it had been exaggerated. Lumbar puncture had yielded forty cubic centimetres of clear, sterile fluid. The cellular contents had not been increased. X-ray examination had revealed slight *spondylitis deformans* of the majority of his vertebræ. Neither the blood nor the cerebro-spinal fluid had reacted to the Wassermann test. The urine had been alkaline; its specific gravity had been 1,018. It had contained no albumin and no sugar. Numerous pus cells and triple phosphates had been present. The diagnosis of tumour of the spinal cord had been made from the following facts. The lesion was a progressive one. There was wasting of the muscles. The sphincters were involved. There were sensory disturbances. The absence of root pains and the extent of the lesion were against a diagnosis of an extra-dural or extra-medullary tumour.

Paralysis Agitans.

Professor Mills showed a patient, aged forty-two years, who had come to the hospital on May 18, 1923, on account of sleeplessness and a tired feeling. These symptoms had been present for twelve months. He had been a plumber since the age of fourteen. Three years before admission he had been treated by a doctor for a "poisoned stomach" after he had been working at Cockatoo Dock on some ships. He had stated that he had not been well since that time. At first he had noticed that he was getting sleepy during the day. He had become tired very easily. The sleeplessness had progressed, but during the previous two months he had become less sleepy. His hands and leg had become very stiff and awkward. He had not worked for nine months. His voice had changed; its pitch had become altered and at times he had difficulty in speaking. On examination it had been found that the patient was well nourished. His expression had been mask-like. He had lain on his back for hours without moving in whatever position he had been placed. He had walked with a slight stoop and had taken short steps. His fingers had been kept bent with his thumb extended along the first digit. His lips had moved only to a slight extent when he had spoken. Occasionally he had slurred his words. There had been some tremor of his lips when he had not been speaking. There had been "trombone" movement of the tongue when protruded. The tongue had been deviated to the right. The left palpebral fissure had been wider than the right. The left eye had moved less freely than the right. The patient had not moved either eye unless asked to do so. There had been much rigidity of all the muscles of the arms and legs. There had been no loss of voluntary power. Absence of associated movements had been noted. No sensory changes had been detected. The reflexes had been normal. The diagnosis of *paralysis agitans* had been made from the following considerations. There were the "mask-like" expression, rigidity, loss of associated movements, drowsiness, slow gait and impaired speech. The origin was probably an infection which had affected the large motor cells of the *globus pallidus*.

Polio-Encephalitis.

The third patient shown by Professor Mills was a woman, aged thirty-three years, who had been admitted to hospital on September 21, 1922, on account of hoarseness of her voice and wasting of the muscles of the right side of her neck. These signs had been present for two years. She had been subject to sore throat and laryngitis. Three years before admission her right shoulder had begun to ache while she was at work. The pain had been constant and severe. It awakened her at night. It had continued up to the time of admission. In November, 1922, she had been attacked with a severe "cold" and had lost her voice. The voice had been husky since. She had stated that she could not cough properly. On examination the voice was found to be hoarse. The patient could speak only with difficulty and slowly. She was unable to cough loudly. Complete paralysis with atrophy of the sterno-mastoid and trapezius muscles of the right side was noticed. There was no sensory disturbance. The reflexes were normal. A laryngeal examination had revealed complete paralysis of the right vocal cord. A diagnosis of polio-encephalitis of infective origina had been made. It was thought that the infection had been from the throat. The lesion was in the vicinity of the nuclear cells of the accessory nerve and the accessory portion of the vagus.

Incontinence of Urine.

MR. R. GORDON CRAIG presented a patient, a girl aged eighteen years, who had been suffering from incontinence of urine both during the day and the night. Her disability had impelled her to avoid all social intercourse. The cystoscopical examination revealed no evidence of an abnormal placing of the ureters. There was seen a relaxed condition of the *sphincter vesicæ*. An operation had been performed to remove the disability. The sphincter of the bladder had been exposed through a supra-pubic incision and a V-shaped section had been removed, after the lower edge of the sphincter had been seized with a small vulsellum forceps. The raw surface had then been sewn with No. 0 catgut by means of a long-handled, straight needle holder and a fully curved needle. The bladder had been drained supra-pubically and the wound had closed within a few days of the removal of the drain. The patient had left the hospital in three weeks with perfect control of the bladder both during the day and during the night time. Mr. Gordon Craig stated that the deduction to be drawn from this case was that at times incontinence of urine could be cured by a plastic operation on the sphincter of the bladder.

Melanomatous Tumours.

DR. ST. JOHN W. DANSEY showed a patient, aged forty years, who had come to the hospital on account of an attack of appendicitis. It had been noted that he had a pigmented mole on the right side of the neck behind the angle of the jaw. The patient had stated that the spot had become coloured during the previous two years and had increased in size in the previous two months. At the same time as the appendicectomy had been carried out, the mole together with the surrounding skin and deep tissues and an enlarged lymphatic gland had been excised and submitted to the pathologist for examination and report. It had been found that the mole was a basal cell carcinoma of the skin containing no melanin, but in the gland there was a metastatic growth of the primary skin tumour, containing melanin. The patient had been re-admitted on June 16, 1921, for the removal of the deep cervical glands on the right side of the neck. This operation had been carried out and the whole of the glandular tissue, together with the sterno-mastoid muscle had been removed down to the clavicle. The uppermost of the glands had been sent to the pathologist, who had reported that it contained melanin granules, but the lowest glands were free. The wound had healed. The area of the neck that had been involved, had been subjected to a therapeutic course of X-ray exposure. Two years had elapsed. There were no signs of a recurrence. The patient was in the best of health.

A second patient, aged twenty-seven years, had been admitted on December 21, 1921, with a swelling of the left side of the neck. This patient had had a purplish mole behind the left year for twelve years. This mole had begun to enlarge six months previously and three months later it had broken down and discharged. It had been incised by a medical practitioner seven weeks before the patient's admission to hospital and had been found to have been "quite black in the centre." It had not been examined microscopically. Three weeks later the patient had noticed a swelling in the neck below the scar of the incision.

On admission enlarged glands had been felt in front of the upper part of the sterno-mastoid muscle. The whole of the glandular tissue of the left side of the neck with the inferior part of the parotid gland and the sterno-mastoid muscle had been removed under ether anæsthesia. The parotid gland had been found to be pigmented. The report of the pathologist was to the effect that the lymphatic glands and the parotid gland were involved in a melanotic sarcoma. The whole of the left side of the neck had been exposed to therapeutic doses of X-rays. On February 23, 1922, the patient had been admitted on account of some swelling of the right side of the neck. A few enlarged glands had been removed for examination; the condition was found to be a simple adenitis. On September 13, 1922, he had again been admitted to hospital with the history of having noticed a small swelling just behind the lobe of the left ear two weeks previously. A red, tender swelling about the size of an acorn had been found. This and the surrounding skin and deep tissue had been removed. The edges of the wound had not been brought together, so as to facilitate a further course of X-ray treatment. The pathologist had reported that the tissues were affected with melanotic sarcoma. A note had been appended to the effect that the structure of the growth was more of the nature of a melanotic carcinoma than of that of a melanotic sarcoma.

The patient had returned on March 21, 1923, with a swelling behind the right shoulder, which had been present for a month after he had received a blow in that region. An oval tumour had been found on the back over the right scapula. It had been freely movable and not attached to the skin. A pathological examination revealed that the growth was a carcinoma, probably from the basal cell layer of the epidermis. No melanin had been found.

Dr. Dansey said that these two cases demonstrated that superficial melanomata, if excised early and freely with the adjacent glandular tissues, might not lead to secondary deposits in the viscera, especially if the regions of the deposits were subjected to a thorough course of X-ray therapy. He employed the term melanoma to describe these tumours. The term meant the deposit of melanin in tumours. That the growths were malignant was determined by the fact that they were carcinomata or sarcomata. The fact that there was an extensive melanin deposit in the adjacent lymphatic glands draining the infected area was due to the carcinomatous nature of the primary growth.

Epithelioma of the Penis.

Dr. Dansey next presented a patient, aged fifty-one years, who had had phimosis all his life. Four months prior to admission he had noticed a small swelling beneath his foreskin and later some discharge from the orifice of the urethra. He had syringed the inside of the prepuce with a solution of copper sulphate. Ulcers had then appeared on the prepuce attended with some discharge. There had been a dull, aching pain in the *glans penis*. He had not lost weight. The patient gave no history of a gonnorhœal or syphilitic infection. His serum did not react to the Wassermann test.

On admission it had been found that the terminal five centimetres of the penis were greatly swollen, red, hard and tender to touch. The prepuce was fixed and on it were three discharging ulcers. The superficial and deep inguinal glands were enlarged, discrete and hard. Under ether anæsthesia the foreskin had been slit up. This had led to the exposure of a cauliflower-looking mass attached to the base of the *glans penis*. A snipping of this growth had been taken for histological examination. The pathologist had reported that it was a squamous epithelioma. A radical operation had then been undertaken. The superficial and deep lymphatic inguinal glands on both sides had been removed and the spermatic cords had been tied as high up as possible. The penis had been dissected back to the inferior fascia of the uro-genital diaphragm. About 3.75 centimetres of the *corpus spongiosum* had been left together with the urethra. The penis and the testes as well as the greater part of the scrotum had then been removed *en masse* with the glandular tissues of the groin. The inferior part of the scrotal flap had then been perforated at its base to admit of the passage of the *corpus spongiosum* and urethra. The urethra had been stitched in position and a catheter passed into the bladder. The upper edge of the scrotal flap had been united to the edge of the transverse incision over the pubes. In spite of some slight ulceration of the line of suture and a mild attack of erysipelas on the wound about three weeks after the operation, the patient had made a satisfactory recovery. The whole of the affected area had been exposed to X-rays. Dr. Dansey exhibited the growth.

In discussing the subject, Dr. Dansey said that there was no doubt that phimosis, congenital or acquired, was a condition that favoured cancer of the penis by the chronic irritation of retained smegma. Bland Sutton had stated that the outlook for the patient after recovery from a complete radical operation was good. Dr. Dansey asked other surgeons to relate their experience. It was not easy to believe that with such diffuse involvement of the superficial glands, the deep lumbar glands could have escaped.

Foreign Body in the Bladder.

DR. B. T. EDYE introduced a patient, aged thirty-nine years, a labourer, who had been admitted to hospital on April 17, 1923. The patient had stated that he had had an operation performed for stricture of the urethra five years previously at the Sydney Hospital and that since that time he had kept the stricture dilated by means of a glass catheter. He had made this catheter from a portion of glass tubing having a diameter of 11 millimetres (7/16 inch). Two days before admission the patient had passed the catheter and on withdrawing it, had found that the terminal 2.5 centimetres had broken off and had been retained in the bladder. After the accident he had suffered from painful micturition and hæmaturia. On admission his temperature had been 37.2° C. (99° F.) and his pulse-rate 88.

On April 18, the bladder had been opened supra-pubically and the foreign body removed. A careful search had been made with the aid of an electrically illuminated speculum for other fragments, but none had been found. The bladder had been closed and a gauze wick placed in the abdominal wall. A Jacques catheter had been left in the urethra until April 23, 1923. The patient had been

discharged on April 30 in good health and had been advised to forget about his stricture for three months or longer.

The patient had informed the house surgeon that he had picked up the piece of glass tubing in a shed and had thought that it would be a good thing with which to dilate his stricture. He had, therefore, rounded the end and had bent it to a suitable curve in a flame. He had used it three times a week. Before he had passed the instrument, he had on each occasion poured boiling water over it and then had allowed it to cool. If this history were correct, the stricture must have been very well dilated before the patient had used this home-made catheter, the diameter of which was eleven millimeters (almost a half of an inch). This was larger than the largest sound. It spoke well for the patient's cleanliness that after five years there had been little evidence of inflammation of the bladder mucosa at the time of the operation.

Salpingitis.

DR. H. H. SCHLINK read a report of a case of salpingitis with a sinus opening in the groin. This paper will be published in a future issue.

Ruptured Ectopic Gestation in Cornu of the Uterus.

Dr. H. H. Schlink and Dr. B. T. Edye demonstrated a case of ruptured ectopic pregnancy in the cornu of the uterus and showed the specimen. The report will be published in a future issue.

Miliary Tuberculosis of the Pelvic Organs.

Dr. H. H. Schlink also recounted the history and clinical course of illness of a patient who had suffered from miliary tuberculosis of her pelvic organs. The patient had been admitted to the Royal Prince Alfred Hospital on April 13, 1921, complaining of leucorrhœa with headache of four or five days' duration at the time of her menstrual periods. The periods had commenced at the age of fourteen years, had been irregular, had lasted for seven days and had been severe for three years. On examination it had been found that the uterus was small and anteflexed, but nothing abnormal had been felt in the fornices. On August 18, 1921, the patient had returned complaining of amenorrhœa for two weeks, attended by frequency of micturition. She had then been in a highly nervous condition. The uterus had been found to be small, anteflexed and fixed by a large mass in the posterior fornix. Laparotomy had been performed at once. The intestines had been glued together and the whole of the pelvic organs had been massed and adherent. Miliary tubercles had been studded over the surface of the organs. Dr. Schlink exhibited organs removed at operation. A supra-vaginal hysterectomy had been carried out with removal of the tubes and ovaries *en masse*. The appendix had also been removed and the pelvis had been drained through the vagina on account of the soiling of the peritoneum and the inflamed and angry appearance of the tissues. The patient had made a rapid recovery. The temperature had not exceeded 37.8° C.. The vaginal drainage tube had been removed after forty-eight hours and very little discharge had been present. The wound had healed without the formation of a sinus.

Dr. Schlink stated that, as the endometrium had appeared to be normal at the time of a preliminary curettage, he had regarded the infection as one descending from the peritoneum. The patient had been kept in hospital in the fresh air for three months on a forced milk dietary. She had left the hospital on November 19, 1921, and had gone into the country. When she had returned she had gained 12.7 kilograms in weight. She had had very little vasomotor or other menopause disturbance. She had retained her weight and good health.

Fibro-adenoma of the Uterus.

Dr. Schlink presented a patient who had been admitted on March 14, 1922, with menorrhagia of one year's duration. An operation had been undertaken for the removal of the uterus by the supra-vaginal method. The uterus, together with a fibro-adenoma which had been enucleated from the broad ligament, was exhibited. Both tubes and ovaries had been left *in situ*. The patient had made a good recovery.

A Mucous Membrane Fixator for Implantation of the Ureter.

Dr. Schlink exhibited an instrument for the fixation of the vesical mucous membrane in the operation of implantation of the ureter. During his recent visit to Europe, he had seen Professor Franz perform this operation at the Charité Hospital, in Berlin, on a patient with ureterovaginal fistula, the result of injury during a previous Wertheim operation by another surgeon. The ease and speed with which Professor Franz carried out the implantation, had impressed Dr. Schlink. This had been due to a large extent to an instrument which he had not seen before. In the course of conversation, Professor Franz had told him that the instrument had been invented by his assistant, Professor R. Freund. He had performed forty-nine similar operations with it and had had only two failures. When Dr. Schlink had expressed surprise that Professor Franz should have seen so many patients with ureteral fistula in his clinic, the latter had explained that the condition had in the majority of instances been caused by attempts to perform Wertheim's operation on the part of inexperienced surgeons. He had expressed his regret that this operation was very frequently carried out on the Continent.

In describing the instrument, Dr. Schlink stated that he would be happy to lend it to any surgeon proposing to perform the operation. In implantation of the ureter into the bladder by the ordinary method of cutting between fixator clasps through the bladder wall on to a sound, catheter or tongs introduced through the urethra or seizing the mucous membrane immediately after the opening into the bladder was made, there was often delay on account of the clasps failing to grip or fix the membrane or on account of the clasps tearing the tissue. In either case the mucous membrane sprang back and a prolonged search was often needed to discover the opening in the mucous membrane. The ureter was at times implanted between the muscular and the underlying mucous layer in mistake; this accounted for many of the failures of this operation. To obviate this difficulty, Professor R. Freund had had an instrument manufactured which fixed the mucous membrane from the inside of the bladder. It had the further advantage that it could remain in position until the ureter was introduced. The instrument comprised a central guiding rod which terminated in two bayonet needles. These needles could be advanced from two side openings in the cannula during the movement of the guiding rod (see Figures I., II. and III.) After the instrument had been passed through the urethra to the spot selected for implantation, care had to be taken to insure that it lay correctly with the concavity to the front or top. This could be recognized by the position of the screw of the guiding rod, which faced in the same direction. The guiding stem was then pushed forward as in Figure IV. This caused the bayonet needles to pierce the bladder wall. Should the needles fail to penetrate the peritoneal surface of the bladder wall, gentle

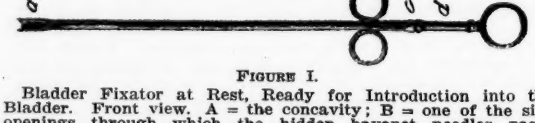


FIGURE I.

Bladder Fixator at Rest, Ready for Introduction into the Bladder. Front view. A = the concavity; B = one of the side openings through which the hidden bayonet needles pass; C = screw of the guiding rod on the same side as the concavity.

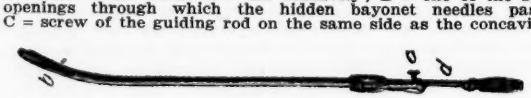


FIGURE II.

Side view of the Fixator.

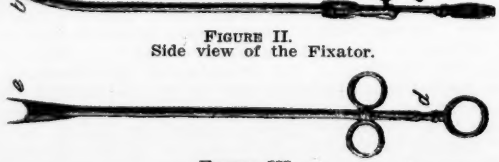


FIGURE III.

The Instrument in action. The guiding rod is pushed forward and the two bayonet needles have appeared at the side openings.

pressure with dissecting forceps over the needle points sufficed to make them appear. The assistant then held the handle of the instrument. It was found that the mucous membrane of the bladder was so firmly held by this device that the membrane was unable to retract as the bladder wall was incised from above and between the two needle points. A further advantage was that the instrument was not removed until the end of the operation.

FIGURE IV.

The Instrument *in situ*. The guiding rod is pushed forward and the bayonet needle points pierce the bladder wall and fix the mucosa. The bladder wall is incised between the needle points, the ureter is caught by a mattress suture and is drawn through the opening in the bladder wall immediately before it is tied.

FIGURE V.

The Instrument *in situ*, showing the needle points fixing the mucous membrane.

A Case for Diagnosis.

DR. H. R. G. POATE asked his colleagues if they could help him in the diagnosis of the condition from which a patient was suffering. The patient was twenty years of age. The patient had stated that in the first four months of 1920 he had had a succession of boils all over his body. In June, 1920, he had noticed a swelling in the left axilla which had been opened six days later. Pus had evacuated in considerable quantity. The wound in the axilla had closed in a few days and the abscess had recurred and had burst several times within a few months. Several sinuses had formed, opening below the axilla. In October, 1920, the abscess had been opened under anæsthesia. In February, 1921, the patient complained that there was tenderness below the clavicle. He had entered Newcastle Hospital and had been operated on. No evidence of a bony lesion had been discovered in the skiagram. In March, 1921, Dr. Poate had seen the patient for the first time. He then had a very large, granulating cavity extending under the full extent of the *pectoralis major*. On five occasions the condition had been cleaned up under general anæsthesia. The histological examination of pieces of tissue removed for the purpose failed to yield any diagnostic information. He had had a full course of tuberculin without avail. His blood serum had been tested by the complement fixation (Wassermann) test, but no reaction had been obtained. Anti-specific treatment in all forms, including potassium iodide, mercury and arsenic, had brought about no improvement. "Intramine," "Collosol Silver," "Collosal Manganese" and "Trimine" had had no effect. Iodoform-bismuth paste, bismuth formic iodide, "Aristol" and the like had made no difference. Mixed vaccines, "Phylacogens," polyvalent anti-streptococcic serum, plain horse serum, anti-diphtheritic serum had given no benefit. Scarlet red and various ointments and lotions of all kinds had had no lasting effect. "Clever Mary," solution of magnesium sulphate, balsam of Peru and *oleum ricini*, foments and other dressings had been tried. Sun baking had also been used. Diathermy and ionization had not been employed on account of the large area involved, nor had X-rays been applied therapeutically. He was at the time of the meeting having a course of "Trépol," while some areas were being strapped with zinc oxide strapping and cleaned up with "Solyptol." The area looked better than at any previous time. Dr. Poate was unable to determine the nature of the lesion.

Paralytic Deformities.

DR. LENNOX G. TEECE exhibited four patients to illustrate the results of operative treatment of different types of paralytic deformities. The first patient, a woman, aged thirty years, had suffered from a left hemiplegia, the result of an extensive compound comminuted fracture of the skull with great actual destruction of brain substance. The thigh muscles had recovered to a great extent, but there was no muscular power below the knee. Structural shortening of the calf muscles and *tendo Achillis* had produced an equinus deformity. The paralysis of her arm had prevented the use of crutches with the result that she had been bedridden for two years by the time Dr. Teece had first seen her. The *tibialis anticus* and the *peroneus longus* had been given the function of ligaments. This had been achieved by passing them through a hole drilled through the tibia and sewing them together, after the *tendo Achillis* had been lengthened to overcome the fixed deformity. These muscles had thus been made to hold the foot permanently in a position at right angles to the leg. The patient had a satisfactory gait with more elasticity in it than would have been the case had ankylosis of the ankle joint been effected. Notwithstanding the fact that the operation had been performed more than two years previously, the affixed tendons showed no signs of stretching. Some authorities alleged that this was a danger which existed. Dr. Teece had not encountered it in his practice.

It was always advisable in performing tenodesis to affix the tendons firmly into bone. This was illustrated in the case of a girl, aged ten years, who had suffered from paralytic *equino-valgus* as a result of paralysis of the *tibialis anticus*.. Five years previously another surgeon had lengthened the *tendo Achillis* and without dividing the *tibialis anticus*, had sewn it to the periosteum covering the shaft of the tibia, in order to hold at foot at right angles to the leg. The deformity had remained corrected for five years and had then recurred. It had been found that the tendon had been torn away from the attachment to the periosteum. Dr. Teece had re-lengthened the *tendo Achillis* and re-attached the tendon of the *tibialis anticus* to the left of the tibia, this time by passing it through a hole drilled in the bone. At the same time he had transplanted the tendon of the *extensor proprius hallucis* to the inner side of the tarsus to act as a dorsi-flexor and invertor. The tenodesis had been performed in addition to the transplantation, because it would have been unreasonable to have expected so small a muscle as the extensor of the big toe to carry out the functions of the *tibialis anticus* unassisted and unprotected.

The third patient was a boy of twelve, who had suffered from a paralytic *equino-varus*. The varus had been caused by a paralysis of the *peroneus brevis*. The equinus had arisen as a result of the unequal rate of recovery in other muscles. The calf muscles had recovered first and this had led to the fixation of the foot in a position of equinus. Subsequently the dorsi-flexors had recovered, but they, of course, had been unable to overcome the fixed deformity of equinus. The equinus had yielded immediately to lengthening of the *tendo Achillis*. It had been necessary to perform Ober's operation of detaching the ligamentous attachments from the medial malleolus and carrying out a sub-periosteal ligamentous detachment on the inner side of the tarsus from the astragalus, *os calcis* and scaphoid bone. This procedure had been efficacious in overcoming the inward tilt of the *os calcis* often evident in these cases. The *extensor proprius hallucis* had then been transplanted to the base of the fifth metatarsal bone to act as an evertor in the place of the paralysed *peroneus brevis*. Dr. Teece maintained that this type of paralysis affecting the lower extremity, namely that of a single muscle, was with rare exceptions the only one that could be treated satisfactorily by means of tendon transplantation unaided by accessory measures.

Dr. Teece's fourth patient was a girl, aged fourteen years. She had suffered from paralytic *calcaneo-cavus*, caused by paralysis of the *gastrocnemius* and *soleus* muscles. The cavus deformity had been easily corrected by division of the plantar fascia, followed by wrenching. Both the *peroneus longus* and the *peroneus brevis* and the *flexor longus digitorum* and the *flexor hallucis* had been transplanted in the *os calcis*. Lateral stability of the foot had been secured by arthrodesis of the joint between the astragalus and the *os calcis* through the same incision as

that used for the transplantation. An improved, but by no means perfect gait was all that could be attained by operative measures in paralytic *calcaneo-cavus*, for nothing could replace in an adequate manner such powerful muscles as the *gastrocnemius* and the *solcus*.

Perthes's Disease.

DR. D. J. GLISSAN presented three patients, the subjects of Perthes's disease. The first was a boy, aged seven years, who had been seen for the first time on March 28, 1923, when he had complained of pain in the left knee and limping. He had been quite well up to Christmas, 1922. The limp had then been noted and he had complained of pain in the left knee joint four weeks before he had been brought to the hospital. There was no history of a trauma. The family history did not reveal a tuberculous taint. The patient had four healthy brothers and sisters. The von Pirquet test had been applied, but no reaction had followed. The patient, a thin, wasted boy, had walked with a limp, holding his left thigh adducted and flexed. There had been slight flexion and adduction deformity with nineteen millimetres (three-quarters of an inch) apparent shortening. The tip of the left trochanter had been a little above Nélaton's line. There had been slight limitation of flexion and total limitation of extension, internal rotation and abduction. All attempts to perform these movements passively had caused pain. There had been no sign of abnormality at the knee joint. The skiagram had revealed the typical changes in the upper epiphysis of the femur. This was much flattened, was fragmented and appeared to be denser than on the unaffected side. The femoral neck was rarefied; there was *coxa vara* deformity. Under ether anæsthesia the limb had been abducted, extended and rotated inwards to a slight extent and a plaster spica had been applied from the lower part of the thorax to the toes to hold the limb in the corrected position. The child walked on crutches with a patten under the sound foot. Dr. Glissan stated that the history, the clinical signs and the skiagraphic evidence were typical of Perthes's disease.

The second patient was four and a half years of age. He had been brought to hospital on May 30, 1922, with a history of intermittent limping and pain in the left knee of three months' duration. There was nothing in the anamnesis of importance in the diagnosis. Physical examination had revealed no sign of involvement of the hip and the knee joint had appeared to be perfectly normal. There had been no limp. Dr. Edwards had reported that there was probably a small area of rarefaction in the epiphyseal cartilage of the upper end of the left femur, but this was by no means definite in the skiagram. There had been no reaction to the von Pirquet test. The patient had been advised to rest the left limb as much as possible. The best hygienic conditions available had been prescribed and the parents had been told to bring the child to the hospital should the trouble recur. On September 20, 1922, the parents reported that the child had been free from all signs of trouble up to September 6, but that on that date he had begun to limp and had cried at night because of the pain in the knee. The patient at that time walked with a definite limp. Physical examination revealed a slight but definte limitation of movement at the left hip joint in all directions. This was greatest in abduction. No signs of abnormality had been detected in the knee joint. The skiagraphic appearance was unchanged. No definite diagnosis had been made at the time, but the condition had been regarded as a probable early tuberculous infection. As there was indication for rest to the joint, the limb had been fixed in abduction and extension in a plaster hip spica reaching from the lower part of the thorax to the toes and the patient had been allowed to walk about on crutches with a patten under the sound limb. He had been instructed to return to the country and to be brought to hospital a month later. On January 10, 1923, the parents had reported that the child had been comfortable and free from pain, except for one or two slight and evanescent attacks to which the mother had paid but little attention. The child had been in good condition and had gained in weight. On removal of the plaster bandage the skiagram had revealed definite flattening of the upper epiphysis of the femur. The epiphysis was vacuolated and there was rarefaction of the femoral neck. Dr. Edwards had considered the appearances as suggestive of Perthes's disease. The spica had been reapplied and the patient had returned to the country. He was to be brought to the hospital at a later date. On April 23, 1923, the mother had stated that the child had been very comfortable and quite free from pain. She had found it difficult to prevent him from putting his weight on the affected limb from time to time. A skiagram had been taken after removal of the spica. The epiphysis was seen to be slight broadened and more flattened than on January 10, 1923. It was also more vacuolated. The appearance was strongly suggestive of Perthes's disease. The child had been fitted with an accurately adjusted walking caliper and had been sent home after a short period of observation. Instructions had been given to report at once if any untoward symptoms were noted. After a few months, if all appeared to be well, the mother was to bring him to the hospital. Dr. Glissan thought that the condition was Perthes's disease. It was of interest in demonstrating the changes that had taken place in the almost complete absence of weight bearing. There was still some flattening and broadening of the epiphysis of the femur. The epiphysis was not fragmented, but contained several areas of rarefaction, which gave rise to the appearance of vacuolation. There was no sign of *coxa vara*.

The third patient was a boy, aged three years, who had complained of a limp on the left side. He had not been perfectly well for eighteen months. At that time an abscess had formed on the left knee and he had been lame since. The pain had extended from the left groin to the knee. There had been no night pains and the patient had not lost weight. Two of the patient's brothers had died of tuberculosis. There was no history of trauma. The patient was a stout, healthy looking little boy. He walked with a pronounced limp. He stood with the left thigh flexed and the left side of the pelvis tilted downwards. Flexion was painless and carried out to the full degree. Extension was limited in the presence of flexion deformity. The limb was fixed in moderate abduction. Adduction and further abduction were completely restricted. There was 12.7 millimetres (a half of an inch) apparent shortening. Rotation, particularly internal rotation, was limited. There was slight wasting of the left thigh and buttock. The von Pirquet test had not been carried out. It was considered that the presence of free and painless flexion in conjunction with restriction of all other movements and the fact that the patient, an abnormally heavy child, had been walking on the affected limb for at least twelve months, rendered it possible to exclude tuberculous disease as the causal condition. A skiagram taken with the aid of the Potter-Bucky diaphragm revealed flattening and fragmentation of the epiphysis. The diagnosis of Perthes's disease had been made and the patient had been treated in a paster of Paris hip spica. He had been ordered crutches and a patten for the sound leg. Dr. Glissan admitted that the absence of the von Pirquet test left a regrettable gap in the evidence for or against the diagnosis of Perthes's disease. It was felt that the condition was not a tuberculous one. The chief point of interest was the presence of abduction deformity.

Tuberculous Disease of the Hip Joint.

Dr. Glissan presented a girl, aged thirteen years, who had suffered from tuberculous disease of both hip joints at the age of four years. She had been brought to hospital on May 25, 1923, on account of her inability to walk properly. Examination had revealed an ill-nourished, unhappy looking child with firm bony ankylosis of both hip joints. Each thigh had been adducted and flexed. The deformity had been greater on the right side; the right thigh had been crossed in front of its fellow, so that the child had walked with her legs crossed. The shadow of an abscess had been seen on each side in the skiagram. The shadow on the left side had been well defined, pear shaped, about the size of a sparrow's egg and suspended from the neck of the femur. That on the right side had been of much greater extent, had been ill-defined and had tracked down in the adductor plane. After a preliminary course of treatment, directed toward the improvement of the child's general health, a cuneiform ostectomy had been performed at the level of the lesser trochanter on the

right side. The limb had been brought outward in the extended abducted position and secured in a plaster spica. Owing to the long continued pressure of the thigh, the vulva had become much distorted. The child was able to walk at the time of the meeting with the limbs well apart. Her walking was comfortable. It had been interesting to note the improvement in the child's physical and mental condition following the improved function. At a later stage it was proposed to perform arthroplasty on the left side, provided that her general condition continued to be favourable.

Double Ovarian Carcinoma.

DR. F. A. MAGUIRE, D.S.O., read notes concerning a patient with double ovarian carcinoma. This case will be reported in a future issue.

Pulmonary Embolus and Acute Perforation of a Duodenal Ulcer.

DR. C. CHAPMAN exhibited a specimen to illustrate a pulmonary embolus and an acute perforated duodenal ulcer in the same subject. The patient had been operated on on April 26, 1923, for *carcinoma corporis uteri* by complete removal of the uterus, Fallopian tubes and ovaries. On May 8, the patient had had a sharp attack of dyspnœa and cardiac distress with a rise of temperature and physical signs over the base of the right lung. On May 23, 1923, collapse had ensued and the patient had died. At the autopsy the abdomen had been found to be full of green fluid. There was mild plastic peritonitis, an acute perforating duodenal ulcer, the size of a threepenny piece on the anterior aspect of the duodenum, five millimetres from the pylorus. No inflammatory reaction was present. The ovarian veins were full of clot. The pelvis was completely covered with peritoneum and healthy. The abdominal wound was open to the extent of two centimetres. At the lower end of the wound there was an abscess around an unabsorbed suture, the size of a walnut. This was situated in the middle line, in the layer of subcutaneous fat. The right lung was solid and red in its lower two-thirds. There was a partly organized clot filling the lower large branch of the right pulmonary artery. The remaining organs were healthy. Dr. Chapman said that pulmonary embolism was a surgical disaster that occurred most frequently after uterine operations and especially those for cancer. It usually occurred about the twelfth day and was associated in many instances with thrombosis in the deep epigastric vein from infection around buried sutures. This case, therefore, was typical. The association of an acute perforated duodenal ulcer with pulmonary embolism was probably extremely rare. He had formed the opinion that the ulcer and the embolus had both been the result of the presence of the source of infection in the abdominal wall at the site of operation. Acute duodenal ulcer was a well recognized complication of many infective abdominal conditions, such as suppurative appendicitis. It was characterized by an insidious onset.

Pathological Specimens.

DR. A. H. TEBBUTT, D.S.O., and DR. MONA ROSS showed a series of tumours of the kidney. The demonstration had been planned with much care and ingenuity. An elaborate system of illumination had been installed and large number of beautifully mounted and preserved specimens were displayed to great advantage. The speakers emphasized the histo-genesis and histo-pathology of the renal tumours. Owing to the late hour the demonstration was cut short. The epidiascope could not be used to illustrate the subject matter. Much regret was expressed that the demonstration could not be held as intended. The cause was the inclusion of several demonstrations that were not on the original programme and the fact that much of the time of the meeting had been occupied by the earlier speakers.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

WHISH, GEORGE MILROY, M.B., Bac. Surg., 1912 (Univ. Glasg.), Young.

HUIE, JOHN ZIEGLER, M.B., Ch.M., 1922 (Univ. Sydney), Peak Hill.

THE undermentioned have been elected members of the Victorian Branch of the British Medical Association:

AINSLIE, JAMES PERCIVAL, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital.

DARBY, LEONARD, M.B. *et* Ch.B., 1912 (Univ. Melbourne), Navy Office, Melbourne.

D'ARCY, FRANCES FLORENCE, M.B., B.S., 1923 (Univ. Melbourne), St. Vincent's Hospital, Fitzroy.

DAVIES, ELLICE JEAN, M.B. *et* Ch.B., 1914 (Univ. Melbourne), Chinju, Korea.

GAULT, ADELAIDE GERTRUDE, M.B., B.S., 1923 (Univ. Melbourne), Auburn Road, Auburn.

GODBEHEAR, WESLEY GEORGE CATCHLOVE, M.B., B.S., 1923 (Univ. Melbourne), 34, Rathmines Street, Fairfield.

KING, THOMAS, M.B., B.S., 1923 (Univ. Melbourne), St. Vincent's Hospital, Fitzroy.

SHEIL, DOMINIC VICTOR, M.B., B.S., 1923 (Univ. Melbourne), 510, Rathdowne Street, North Carlton.

WALLACE, HUGH GILMOUR, M.B., B.S., 1920 (Univ. Melbourne), 50, The Avenue, Royal Park.

NOTICES.

THE COUNCIL OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION has arranged the following provisional programme of the Branch meetings. The Scientific Committee reserves to itself the right to modify the arrangement, but it is hoped that no changes will be necessary.

August 1, 1923.

CLINICAL MEETING at the Alfred Hospital.

September 5, 1923.

At the Walter and Eliza Hall Institute of Research in Pathology and Medicine, Melbourne Hospital, at 8.15 p.m.

DR. IVAN MAXWELL: "Modern Views of Asthma, Hay Fever and Allied Disorders, such as Angioneurotic Œdema, Urticaria and Serum Sickness."

October 3, 1923.

CLINICAL MEETING at St. Vincent's Hospital.

Public Health.

"INSULIN."

THE DIRECTOR-GENERAL OF HEALTH has notified us that supplies of "Insulin" are now ready and that the sale of these supplies will be governed by the conditions set out in the following statement. It should be understood that "Insulin" is in no sense a "cure" for diabetes. It is a substitute for glandular deficiency which must be handled with full knowledge and extreme care.

The new preparation, known as "Insulin," for the treatment of diabetes was discovered in Canada and the discoverer, Dr. Macleod, a Professor of the University of Toronto, has patented the preparation with the object of preventing commercial exploitation.

The difficulty in the use of this drug is that a slight overdose will cause serious results to the patient and it is eminently desirable that its administration be periodically controlled by laboratory tests estimating the amount of sugar in the blood.

The conditions upon which the rights to manufacture for Australia were made available to this Department were:

(i.) That the preparation should be sold at cost price;

(ii.) That it should be sold only to competent specialists.

It is proposed in order to observe these conditions that the preparation be sold only to honorary physicians at the

principal hospitals according to the list appended hereunder or hospitals which may be subsequently be added and only at places where the laboratory estimations of the sugar content of the blood are practicable. So far as is at present known the only places where these conditions are fulfilled are Townsville, Brisbane, Sydney, Melbourne, Bendigo, Adelaide and Perth.

It is proposed that the physician who is recognized for the purpose, shall undertake: (*a*) That records shall be kept of each case treated and be supplied to the Director-General of Health periodically; (*b*) that no charge shall be made for the preparation to the patient greater than the amount charged to the physician by the Department; (*c*) that the physician will not supply any "Insulin" to any medical practitioner who is not an honorary physician to one of the hospitals mentioned in the attached list; (*d*) that, wherever practicable, the treatment shall be controlled by estimation of the sugar content of the blood in addition to the clinical control described by Banting, Campbell and Fletcher in *The British Medical Journal* of January 6, 1923.

The following are the hospitals at present proposed:

Townsville: General Hospital.

Brisbane: General Hospital, Mater Misericordiæ and Children's.

Sydney: General Hospital, Royal Prince Alfred, St. Vincent's, Coast and Children's.

Melbourne: General Hospital, St. Vincent's, Alfred, Children's and Queen Victoria.

Bendigo: General Hospital.

Adelaide: General Hospital, North Adelaide and Children's.

Perth: General Hospital.

Fremantle: General Hospital.

Obituary.

WILLIAM RAE YOUNG.

IT is with regret that we announce the death of Dr. William Rae Young, which occurred at his rooms in Macquarie Street, Sydney, on July 7, 1923.

Medical Appointments.

Under the provisions of the *Hospitals and Charities Act, 1922* (*No. 3260*), the undermentioned have been appointed Members of the Charities Board of Victoria: DR. T. E. V. HURLEY, C.M.G. (B.M.A.), nominated by the Metropolitan Hospitals Association and DR. J. L. THOMPSON (B.M.A.), nominated by the Country Hospitals Association.

* * * *

DR. L. V. DARBY (B.M.A.) has been appointed Public Vaccinator at Ultima, Victoria.

* * * *

THE undermentioned have been appointed Medical Referees for the purposes of *The Workers' Compensation Acts, 1916 to 1921*, of Queensland: DR. L. M. MCKILLOP (B.M.A.) and DR. EUSTACE RUSSELL (B.M.A.).

* * * *

THE undermentioned have been appointed members of the following High School Councils of South Australia:

DR. D. M. STEELE (B.M.A.), of Burra; DR. O. W. SMITH (B.M.A.), of Clare; DR. J. STEWART (B.M.A.), of Gladstone; DR. H. E. DUNSTONE (B.M.A.), of Jamestown; DR. E. J. R. HOLDER (B.M.A.), and DR. S. E. HOLDER (B.M.A.), of Wallaroo.

* * * *

DR. G. D. HARRIS has been appointed Acting Surgeon to the Yatala Labour Prison, South Australia, during the temporary absence of DR. W. A. HUNTER (B.M.A.).

* * * *

DR. C. H. BENNETT (B.M.A.) has been appointed District Medical Officer and Public Vaccinator, at Goomalling, Western Australia.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney	Australian Natives' Association Ashfield and District Friendly Societies' Dispensary Balmain United Friendly Societies' Dispensary Friendly Society Lodges at Casino Leichhardt and Petersham Dispensary Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney Marrickville United Friendly Societies' Dispensary North Sydney United Friendly Societies People's Prudential Benefit Society Phœnix Mutual Provident Society
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne	All Institutes or Medical Dispensaries Australian Prudential Association Proprietary, Limited Mutual National Provident Club National Provident Association
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane	Brisbane United Friendly Society Institute Stannary Hills Hospital
SOUTH AUSTRALIA: Honorary Secretary, 12, North Terrace, Adelaide	Contract Practice Appointments at Renmark Contract Practice Appointments in South Australia
WESTERN AUSTRALIA: Honorary Secretary, Saint George's Terrace, Perth	All Contract Practice Appointments in Western Australia
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington	Friendly Society Lodges, Wellington, New Zealand

Diary for the Month.

JULY 17.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JULY 18.—Western Australian Branch, B.M.A.: Branch.
JULY 19.—New South Wales Branch, B.M.A.: Extraordinary General Meeting in connexion with a meeting of the Section of Pædiatrics.
JULY 24.—New South Wales Branch, B.M.A.: Medical Politics Committee; Organization and Science Committee.
JULY 25.—Victorian Branch, B.M.A.: Council.
JULY 25.—Western Medical Association (Parkes), New South Wales.
JULY 26.—South Australian Branch, B.M.A.: Branch.
JULY 26.—Brisbane Hospital for Sick Children: Clinical Meeting.
JULY 27.—New South Wales Branch, B.M.A.: Branch.
JULY 27.—Queensland Branch, B.M.A.: Council.
AUG. 1.—Victorian Branch, B.M.A.: Branch.
AUG. 3.—Queensland Branch, B.M.A.: Branch.
AUG. 8.—Western Australian Branch, B.M.A.: Council.
AUG. 8.—Melbourne Pædiatric Society.
AUG. 10.—New South Wales Branch, B.M.A.: Clinical Meeting.
AUG. 10.—Queensland Branch, B.M.A.: Council.

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